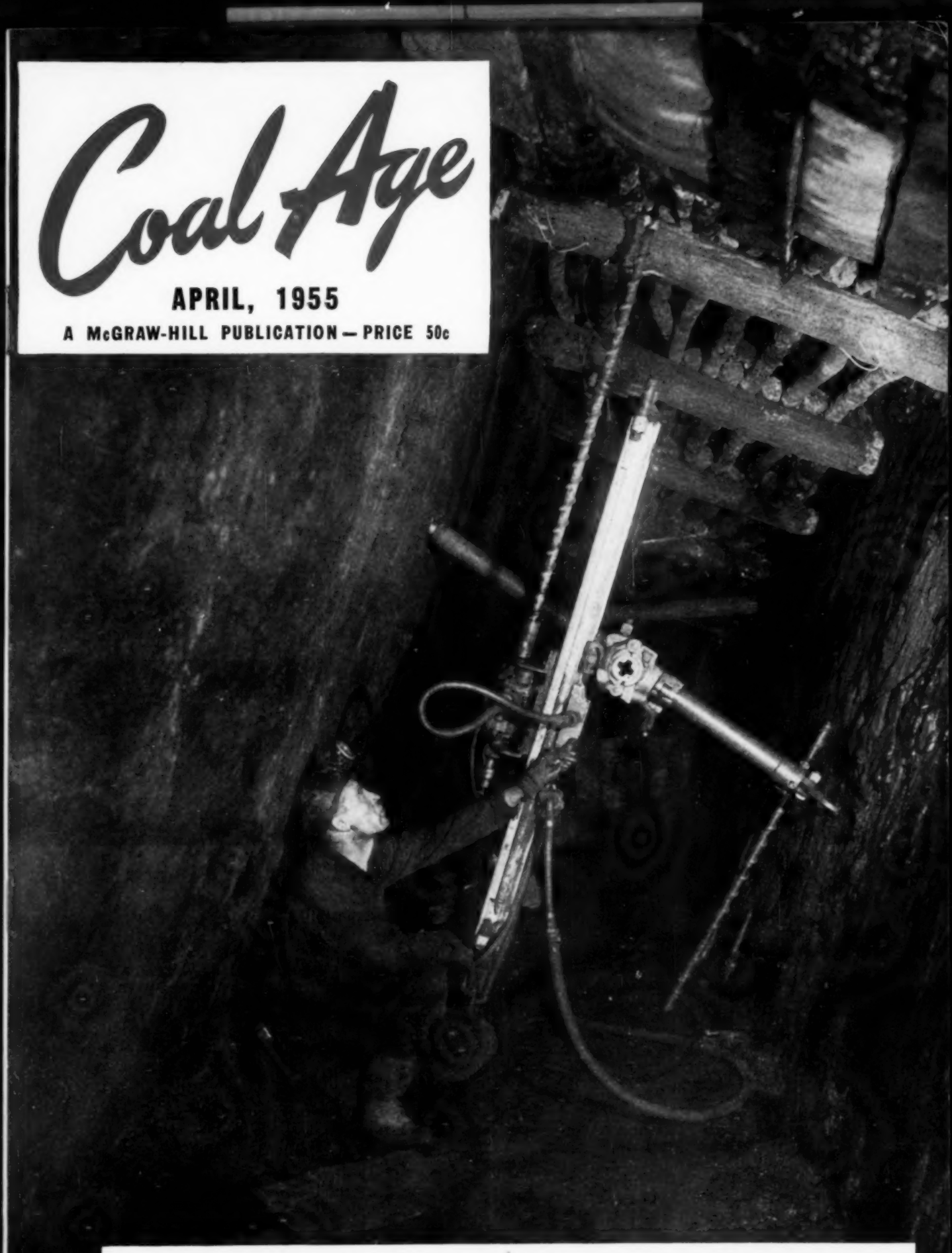
Coal Age

APRIL, 1955

A McGRAW-HILL PUBLICATION — PRICE 50c



EDISON
SELF-SERVICE
...IN MINES EVERYWHERE★

Pick any mining area in the country, and you'll find—in large mines and small mines—Edison Self-Service installations of miners' cap lamps delivering maximum economy and efficiency for the operator.

There are good reasons for this *continuing acceptance* of Edison Self-Service. The simplicity of the system, demonstrated in these many mines over the years, answers the need for effective, minimum cost lamproom procedure. Miners serve themselves . . . move in and out of the lamproom without waste motion. All-important too, is the quality construction and design of the Edison Lamp. This quality translates minimum lamproom care into maximum underground performance. Miners work better, and safer.

You can profit from our long experience in Self-Service. And remember, the Edison Lamp Rental Plan means you can have Edison dependability without a major initial investment. We'll be happy to fill in the details. Write or call.

MSA
SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M·S·A is at your service . . . our job is to help you

MINE SAFETY APPLIANCES COMPANY
201 North Braddock Avenue, Pittsburgh 8, Pa.
At Your Service: 77 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA, LTD.
Toronto, Montreal, Calgary, Edmonton, Winnipeg, Vancouver, Sydney, N.S.

"10 dimes make one

Sure—"ten dimes make one dollar"—but only when you make them make it. It's mighty easy to spend "ten dimes" and not get a dollar's worth of value . . . and on the other hand, "ten dimes" properly spent can be made to make far more than a dollar on your investment! The "little red schoolhouse" was long on theory but short on practical economics.

HULBURT OIL & GREASE COMPANY

PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

dollar"—or do they?

A LOT DEPENDS ON LUBRICATION...

Hulburt

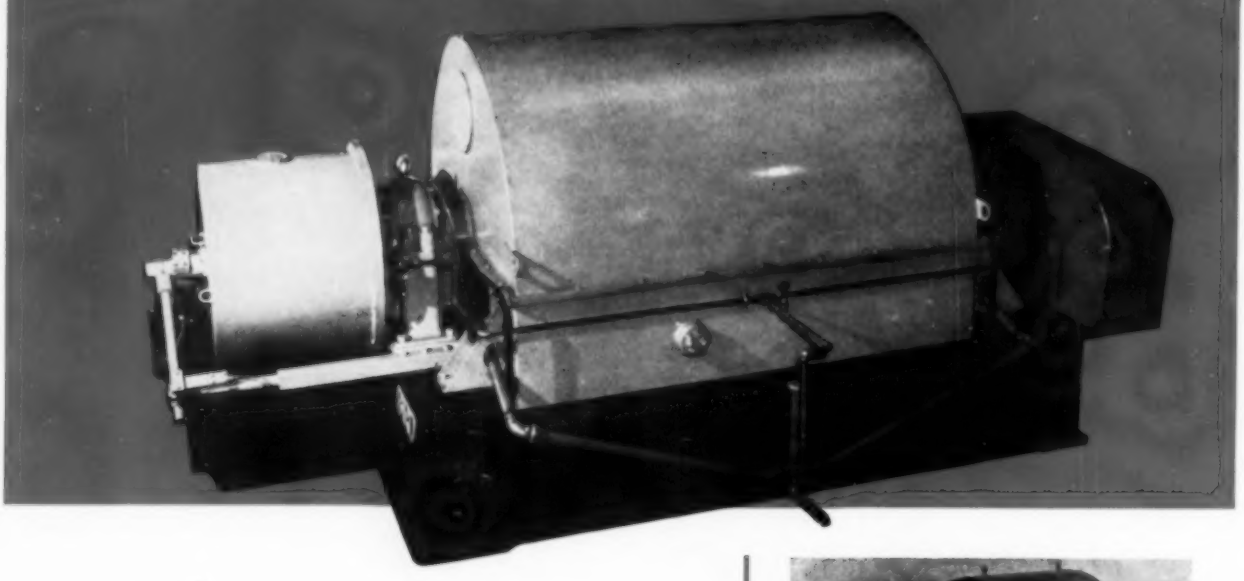
QUALITY LUBRICANTS

Every dime—every dollar—you invest in Hulburt Quality Lubricants return many times their value in MONEY SAVED on "down time" in coal mining machinery, and in giving you the lowest maintenance cost per ton. You invest thousands of dollars in coal mining machines. All the more reason for keeping them out of the red with lubricants proved BEST in that tough "little red schoolhouse," the hard school of experience . . . with HULBURT QUALITY LUBRICANTS.

FIVE CENTS A TON

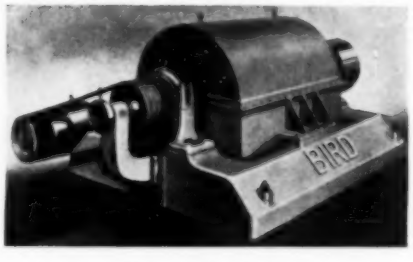
is the cost of dewatering fine coal when you do the job with

BIRD COAL FILTERS



5¢ a ton to operate — two cents a ton to maintain — these are the figures based on actual performance in a large number and variety of coal preparation plants.

Compare this low cost with that of any other dewatering equipment. And keep in mind that the Bird Filter runs continuously for months without maintenance shutdowns — and that it delivers coal at 7% or less surface moisture even when it contains up to 10% minus 200 mesh fines.



This is the BIRD
that cleans the water
that cleans the coal

— putting it in shape for reuse and doing away with stream pollution headaches —

the BIRD POLISHER

Let us tell you what it can do for you.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Coal Age

APRIL • 1955

A Coal Age "Extra" Coming This Year

AS ANNOUNCED on p 126 of this issue, a *Coal Age* "Extra" is coming your way this year—The 1955 COAL AGE MINING GUIDEBOOK, a comprehensive reference guide to modern operating practice in all phases of coal mining: underground, stripping and preparation.

Designed to summarize up-to-the-minute methods in one practical, every-day working manual, the GUIDEBOOK will be published as a separate issue, in addition to the 12 regular monthly issues of *Coal Age* and will be mailed to all subscribers next September. Subscribers will receive the complete GUIDEBOOK issue as an additional *Coal Age* service without change in the regular subscription price.

Incidentally, the 1955 MINING GUIDEBOOK is a direct result of user reaction to the COAL AGE PREPARATION GUIDEBOOK published in the March, 1954, issue. By mail and in personal conversations, hundreds of readers told us they considered this file of fundamental data on modern coal-preparation methods and equipment a really useful tool and indicated that similar treatment of other phases of mining would be most welcome. The 1955 GUIDEBOOK also will include a classified directory of manufacturers of coal mining machinery, equipment and supplies similar to the "Buying Guide" in the preparation section last March.

In its regular issues during the coming year, of course, *Coal Age* will continue month by month to keep you abreast of significant new mining developments, practical, useful ideas utilized at progressive mines, comprehensive analyses of industry problems and trends and the combined experience of many other mining men.

COAL AGE APRIL, 1955
VOLUME 60 NUMBER 4

(with which are combined The Colliery Engineer and Mines and Minerals)

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A McGRAW-HILL PUBLICATION

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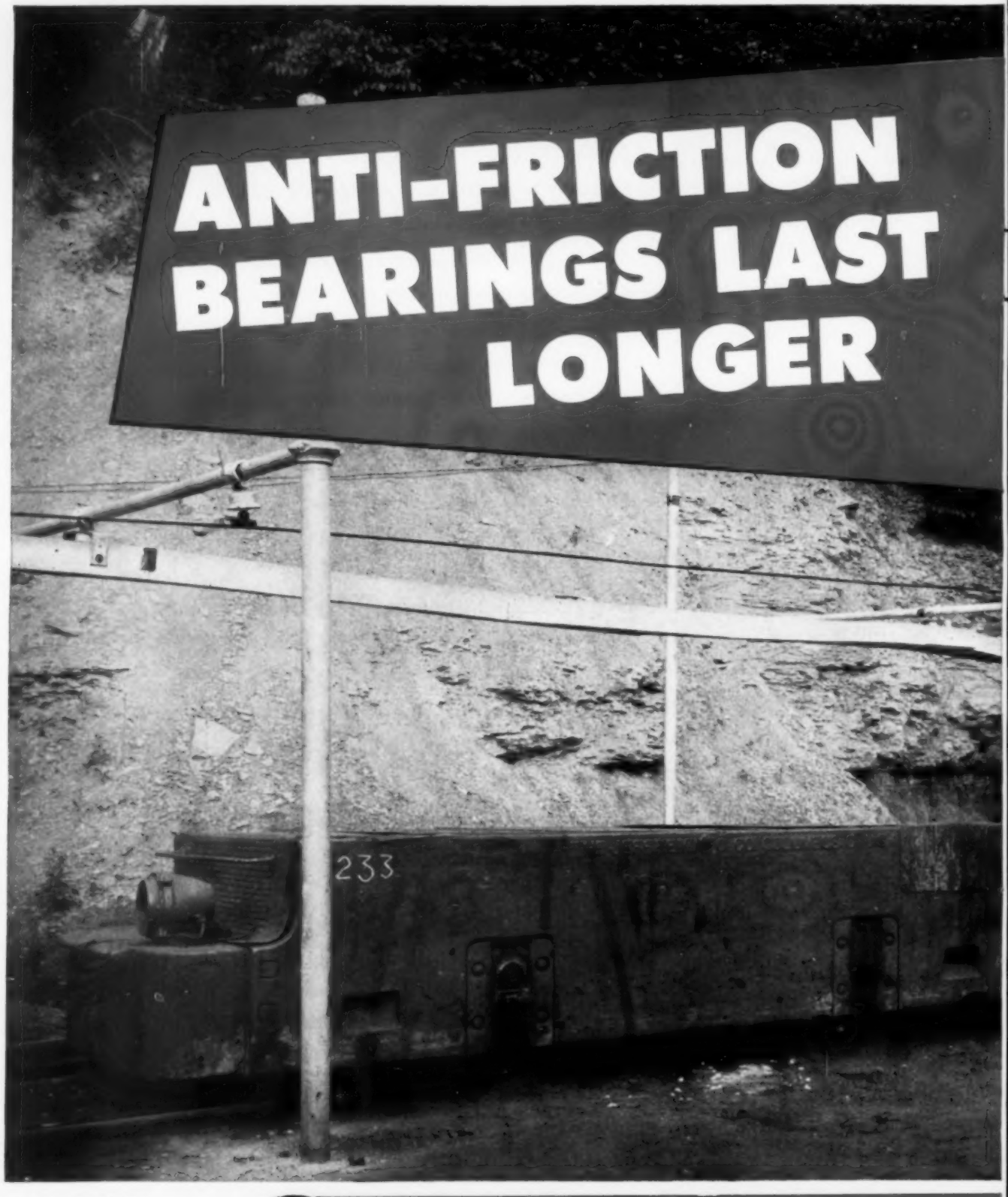
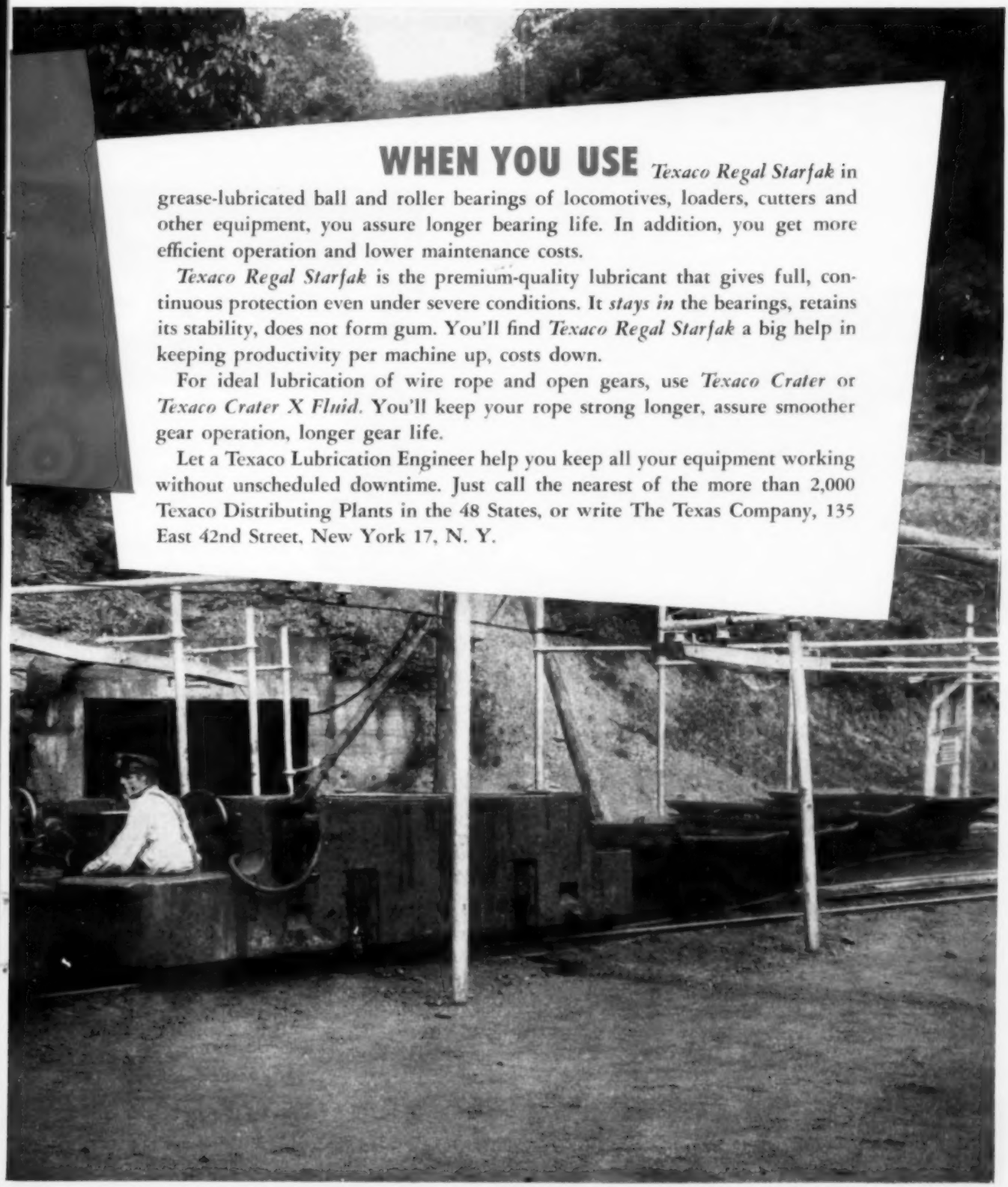


TUNE IN...TEXACO
STAR THEATER
starring
JIMMY DURANTE or
DONALD O'CONNOR
on television...
Saturday nights, NBC.

TEXACO

TEXACO



WHEN YOU USE *Texaco Regal Starfak* in grease-lubricated ball and roller bearings of locomotives, loaders, cutters and other equipment, you assure longer bearing life. In addition, you get more efficient operation and lower maintenance costs.

Texaco Regal Starfak is the premium-quality lubricant that gives full, continuous protection even under severe conditions. It *stays in* the bearings, retains its stability, does not form gum. You'll find *Texaco Regal Starfak* a big help in keeping productivity per machine up, costs down.

For ideal lubrication of wire rope and open gears, use *Texaco Crater* or *Texaco Crater X Fluid*. You'll keep your rope strong longer, assure smoother gear operation, longer gear life.

Let a Texaco Lubrication Engineer help you keep all your equipment working without unscheduled downtime. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICANTS for the Coal Mining Industry

To meet the stepped-up needs of industry . . .

ALLIS-CHALMERS PRESENTS TWO

ALLIS-CHALMERS TS-360

280 HP

15-YD CAPACITY, STRUCK

20-YD CAPACITY, HEAPED

NEW BIG-YARDAGE WORK CAPACITY!

Power that pays

The TS-360's great new Allis-Chalmers engine spearheads a whole new power train that offers more rim pull at lower speeds for better loading, hauling and spreading performance; faster acceleration, easy shifting and quick getaways. Combined with new 20-yd capacity, this all adds up to fast, high-volume, high-profit work cycles.

New operating ease and safety

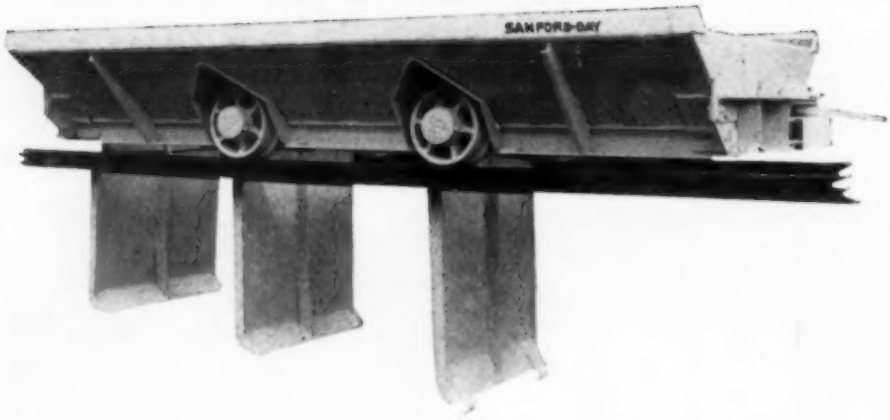
In addition to big-job power and gearing, the TS-360 Motor Scraper offers everything an operator needs to work easily, yet efficiently . . . new Double-Safety air brakes, new selective steering, direct electric starting, new multiple-disc cable control . . . and many others you'll want to know more about.

Strength to back it up!

The new TS-360 is built around a new, all-welded, heavy steel main frame that makes possible the service accessibility of unit construction. What's more, there's an all-new final-drive gear train, with new gears, shafts and bearings. These and many other advantages mean more work done, lower maintenance cost and longer equipment life.

Nowhere can you match these two in the amount of work they do!

ONLY S-D AUTOMATIC bottom dumping cars give you these advantages: (1) "Twin Safety Latches" for safe and sure latching . . . (2) Safety Sealed against dust leakage and (3) ¼ to ½ ton more capacity per car for the same overall dimensions.

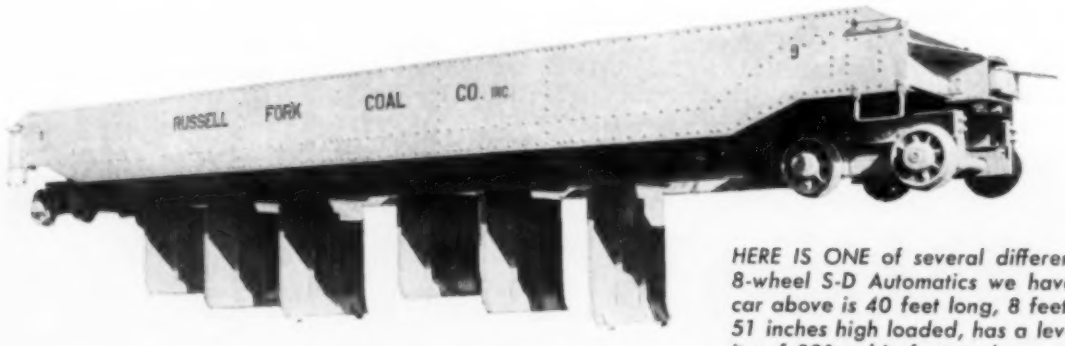


Sanford-Day ... coal Super

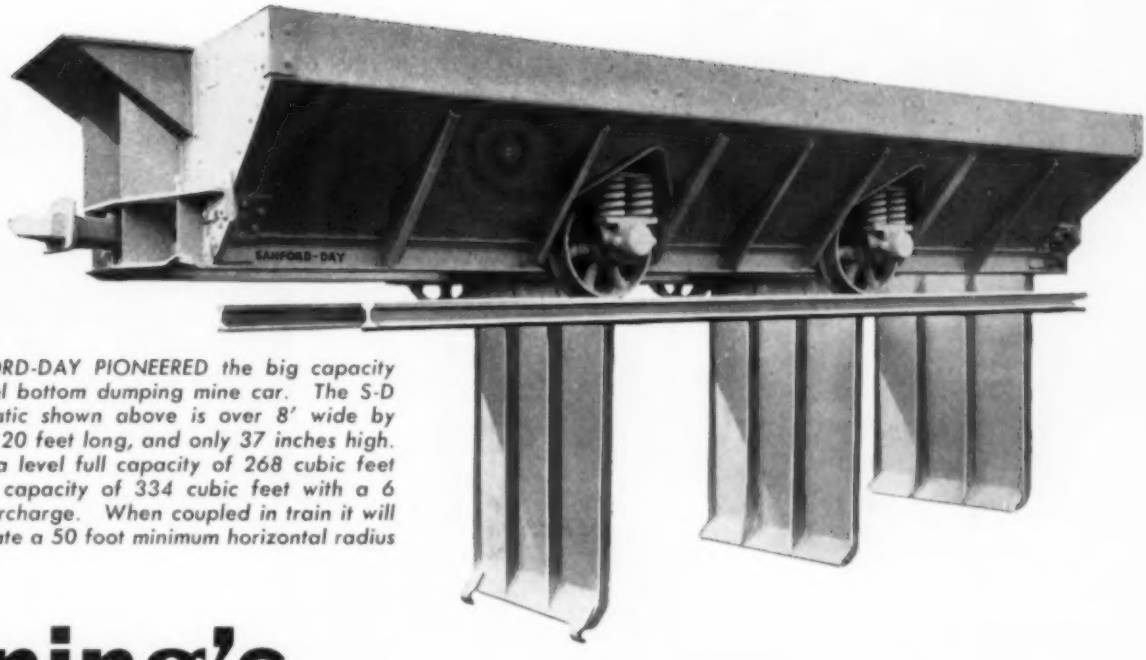
Is there something special you need in mine cars . . . a feature to meet your particular requirements? You probably will find the answer in our plant. Down through 50 years of car building experience we have solved the major problems of mine haulage.

Regardless of the type car you need, we build it . . . cars so constructed to give you the more years of service with the least maintenance. Shown here are just a few of many different types and all built to give you superior service for the lowest dollar.

Regardless whether you need one car or 101, don't hesitate to get one of our engineers into your mine with your officials — face to face with your problem. With this type of cooperation, plus our facilities and capacity to build any type mine car of any size, any haulage problem in your mine can be solved.



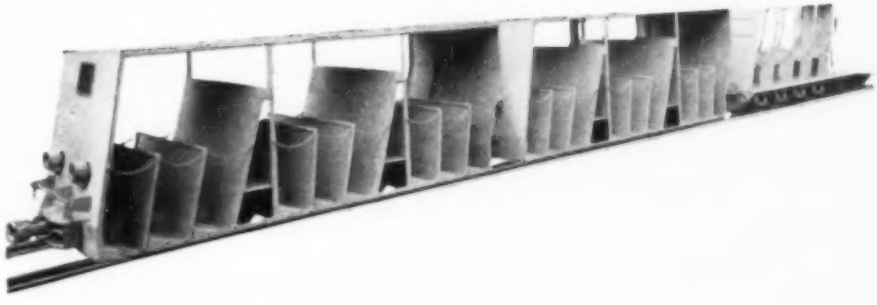
HERE IS ONE of several different designs of 8-wheel S-D Automatics we have built. This car above is 40 feet long, 8 feet wide inside, 51 inches high loaded, has a level full capacity of 831 cubic feet and a capacity of 996 cubic feet with 8" surcharge. This car was equipped with 18" ball bearing cast iron wheels on trucks and may be supplied with or without automatic couplers.



SANFORD-DAY PIONEERED the big capacity 4-wheel bottom dumping mine car. The S-D Automatic shown above is over 8' wide by almost 20 feet long, and only 37 inches high. It has a level full capacity of 268 cubic feet and a capacity of 334 cubic feet with a 6 inch surcharge. When coupled in train it will negotiate a 50 foot minimum horizontal radius curve.

mining's Market for mine cars!

FROM THE WHEELS UP, S-D Man Cars are built into one compact, all-steel unit for safety, comfort and low cost. The S-D Man Cars pictured were developed to operate on a slope with an S-D Safety Control Car. A similar car, the S-D Brakeman Car, also incorporating electrically operated magnetic shoe brakes, eliminates skids and additional locomotives for braking trips down grades.



S-D ROTARY DUMP CAR: We developed the "low-floor" types of large capacity cars and S-D "Whopper" cars to give you more capacity for any given overall dimensions. Car pictured at left is equipped with stub axle spring mounted trucks.

Sanford-Day IRON WORKS

KNOXVILLE • TENNESSEE

AND **BROWN-FAYRO** DIVISION

MINE CARS, All Types - PRECISION WHEELS - "Brownie" HOISTS
CAR RETARDERS - SPOTTERS
PUMPS - OIL SPRAY SYSTEMS

Most Powerful Motor Grader"

For HAUL ROAD BUILDING and MAINTENANCE

the HUBER-WARCO 5D-190

- Power Sliding Moldboard is standard equipment.
- Hydraulically Cab-Controlled Blade Movement—90° either side with no manual adjustments.
- Full 360° Blade Rotation without removing scarifier teeth.
- Mechanical Steering with Hydraulic Booster gives operator perfect control.
- Wheels and 16:00 x 24 Tires are completely interchangeable.
- High Front and Rear Axle Clearance adds to machines' working capacity.

HUBER-WARCO DISTRIBUTOR

HUBER W WARCO

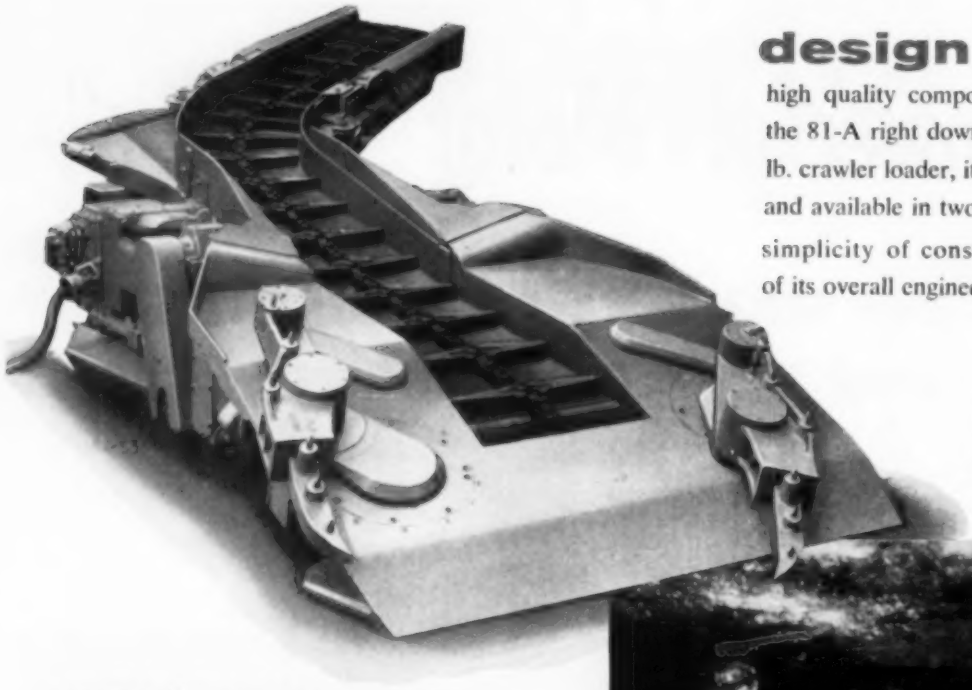
HUBER-WARCO COMPANY

MARION, OHIO, U. S. A.

Road Machinery

CABLE ADDRESS: HUBARCO

ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS



design Good balance, strength, high quality components—all are built into the 81-A right down to the cleats. A 19,500 lb. crawler loader, it is 6′2″ wide, 23′8″ long and available in two heights. Clean lines and simplicity of construction are keynotes of its overall engineering.

performance

Big power for the toughest loading jobs—that's because 64 Horsepower is at your command. Rated capacity is 8 TPM; maximum capacity is 10 TPM. Trams at 137 FPM. The 81-A moves fast from place to place, hits its loading stride quickly and stays on the job till the work is done.

flexibility Conveyor swings 45° either side of center and elevates to properly load shuttle cars on the straight or in break-throughs. Loader can be turned in its own length. Easy maneuverability fits the 81-A right in with your other face equipment and mining cycle.

JEFFREY 81-A... no other loader gives you as much!

maintenance Features like these make the 81-A Loader a real bonus buy on upkeep:

1. Gathering head is fully gear driven . . . no chain drives between head motors and gathering arms.

2. Every motor and gear case is a separate, detachable unit. Unit construction throughout means fast replacement and lower maintenance costs.

3. Head and traction gear parts fully interchangeable between right and left hand sides.

4. Jeffrey's own high-quality chain is used on traction drive and conveyor discharge.

5. Control cases are ventilated to eliminate destructive nitrous oxide.

No other loader *does* offer so much! Don't you agree? Write our Mining Sales Division for specifications and cost esimates.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

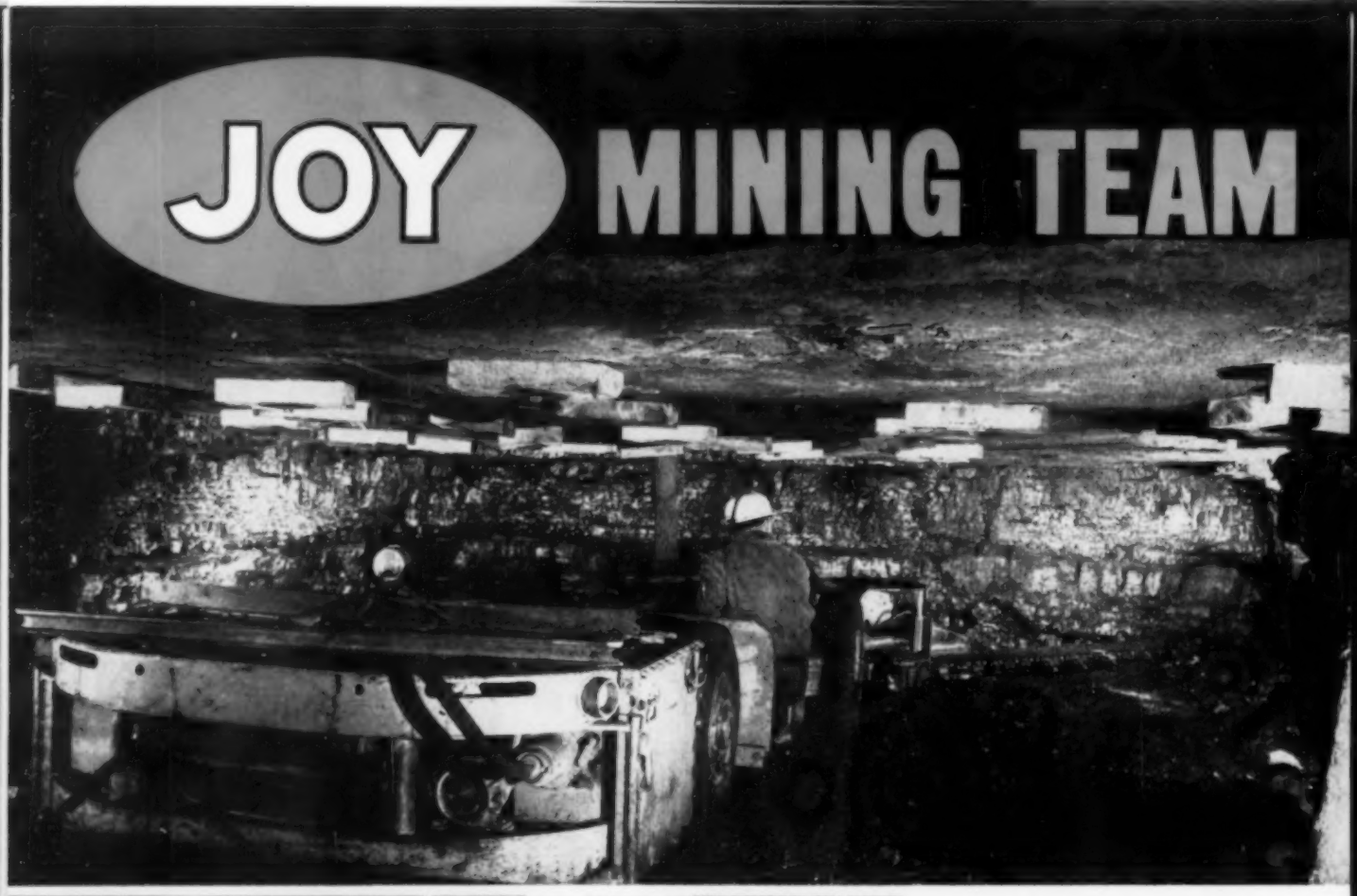
sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

. . .IT'S A JOB FOR JEFFREY!

JOY MINING TEAM



Above, left: The Joy 11-RU is a fast-tramming, fast-cutting, rubber-tired universal cutter that will shear-cut, bottom-cut, center-cut or top-cut anywhere in the seam. Only 31" high for trackless operation in medium-low coal, and equipped with field-proved Bugduster.

Above, right: The Joy Super 14-BU is in a class by itself among self-propelled mechanical loaders for medium-height seams. Built in 31½", 33" and 36" heights, with maximum loading capacity of 10 tons per minute, this dependable unit is powered and constructed on the "extra" principle throughout, for maximum speed and ruggedness in heavy duty service.

Center, left: The CD-22 Coal Drill is a single-boom hydraulic drill, 30" high. Rubber tire-mounted and readily maneuverable, this mobile Joy drill permits fast and accurate hole positioning. Infinitely variable hydraulic control of feed and speed assures fast drilling under all conditions.

Bottom, left: The Joy 6-SC Shuttle Car can make its round trip from the face in less time than any other car in its class. Has exclusive features of drive, steering, braking and control that mean greater speed, power, maneuverability, safety and dependability. Built in heights from 29" to 38½" for capacities from 100 to 180 cu. ft.

HITS 870-TON SHIFT

JOY 11-RU WITH BUGDUSTER, CD-22, SUPER 14-BU AND 6-SC COMBINATION AVERAGES OVER 500 TONS PER SHIFT

Equipment Team: one Joy 11-RU Universal Cutter with Bugduster, one Joy CD-22 Coal Drill, one Joy Super 14-BU Loader and three Joy 6-SC Shuttle Cars.

Number of Men: 13-man production crew.

Operating Conditions: This equipment is being used in a West Virginia mine, working in a seam varying from 4½ to 6 feet high. The seam contains a band of hard slate 4″ to 8″ thick. Grades encountered vary from 3 to 4 per cent. The top is slate and laminated sandstone, bolted with expansion bolts; and the bottom is firm fireclay. The average shuttle car haul one-way is 275 feet, with a maximum one-way trip of 500 feet. A Joy PL-11 Elevating Conveyor receives coal from the shuttle cars at the mine car loading point.

Performance Record: Average production over a month's period has exceeded 500 tons per shift. Maximum production reached a high of 870 tons per shift.

★ ★ ★

No matter what your requirements may be, there is a Joy high-capacity equipment team that can help you show a profit, or increase your margin. For any system, including modern continuous mining with continuous haulage . . . or for any seam condition, Joy has a *field-proved* answer for you. ● *Let us work with you!* **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Joy PL-11 Elevating Conveyor, rubber tire-mounted, permits transfer of coal without delaying shuttle cars.

WRITE FOR BULLETINS, OR

Consult a Joy Engineer

W & D CL5302

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

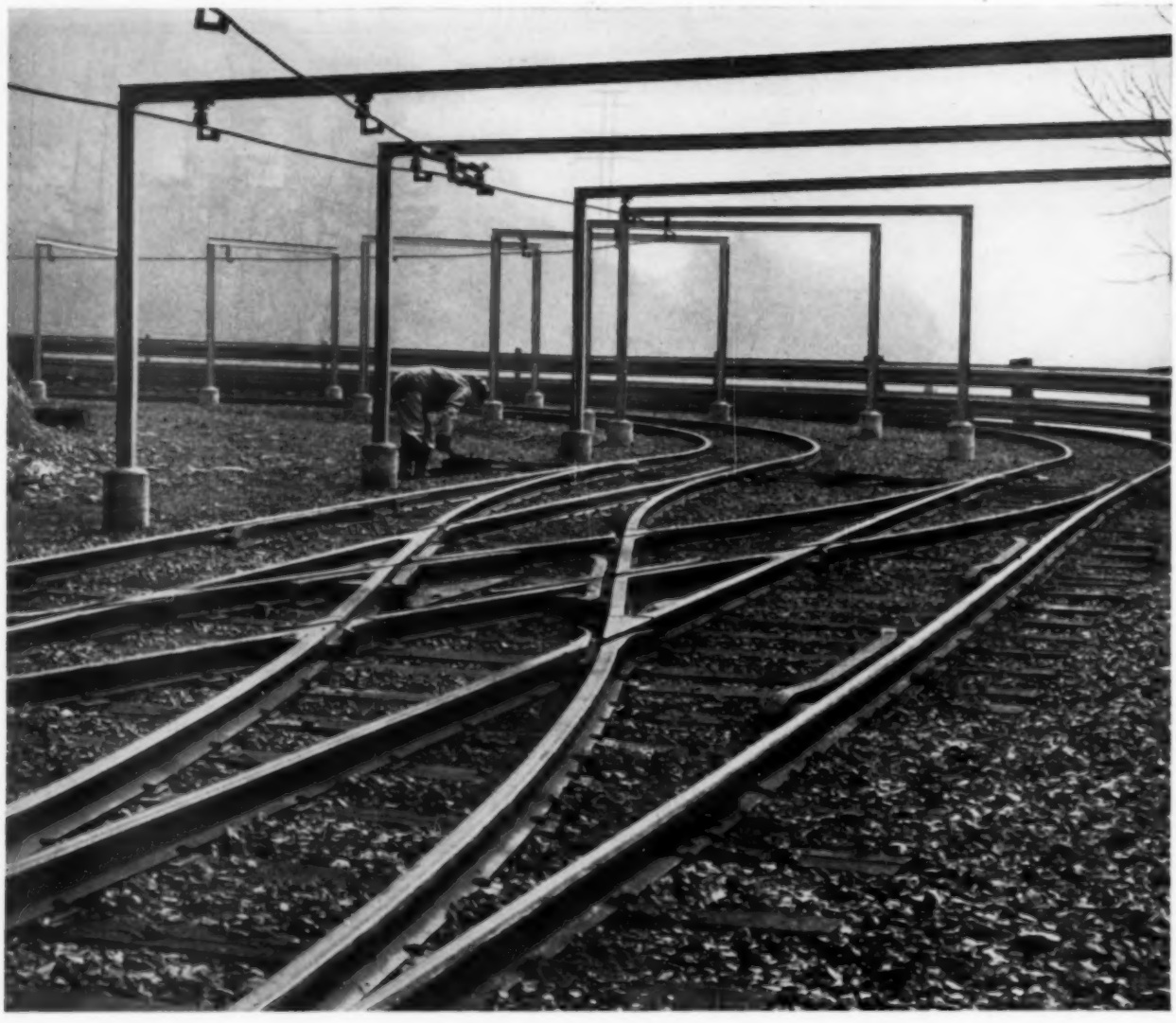
They're here—the newest trucks on the road—ready to tackle your toughest hauling jobs! Ready to perform faster, better and with new cost-cutting economy! Look at the many new heavy-duty Task-Force advances ready to work for you right now!

New capacity—up to 18,000 lbs. G.V.W.! Get it in new 2-ton models and haul the heavy loads with real savings. New Chevrolet Task-Force Trucks are designed and built to handle loads of all kinds and sizes.

New "high-voltage" engines—all *six* featuring a new 12-volt electrical system. Count on quicker, surer cold-weather starting and increased generator capacity—plus a long list of other new advances!

New Work Styling—a new approach to truck design! Here are the first heavy-duty trucks with their own individual styling to fit the job!

MOST MODERN TRUCKS



Track like this leads to more profitable operation

Nice-looking trackwork, isn't it?

Its owners think so. And with good reason: it is steadily paying for itself in operating economies.

Though this system is a large and complex one, its Bethlehem-designed layout opens up bottlenecks, speeds haulage, cuts maintenance.

Its heavy Bethlehem rail was selected for tomorrow's traffic loads as well as today's. This track will stand up for many years to come.

Each of its individual Bethlehem components—curves, turnouts, frogs, crossings—was tailor-made for this job, and preassembled at Bethlehem's plant to ensure smooth installation at the site.

These same principles of modern mine haulage could profitably be applied to your workings. A Bethlehem engineer will be glad to go over the details with you. A phone call or letter to our nearest office will start things moving.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Marion dragline at the Fairview Collieries, Inc., Flamingo Mine, Fairview, Illinois, lays fill for new coal road. Dragline uses Standard greases.

Flamingo Mine uses

CALUMET

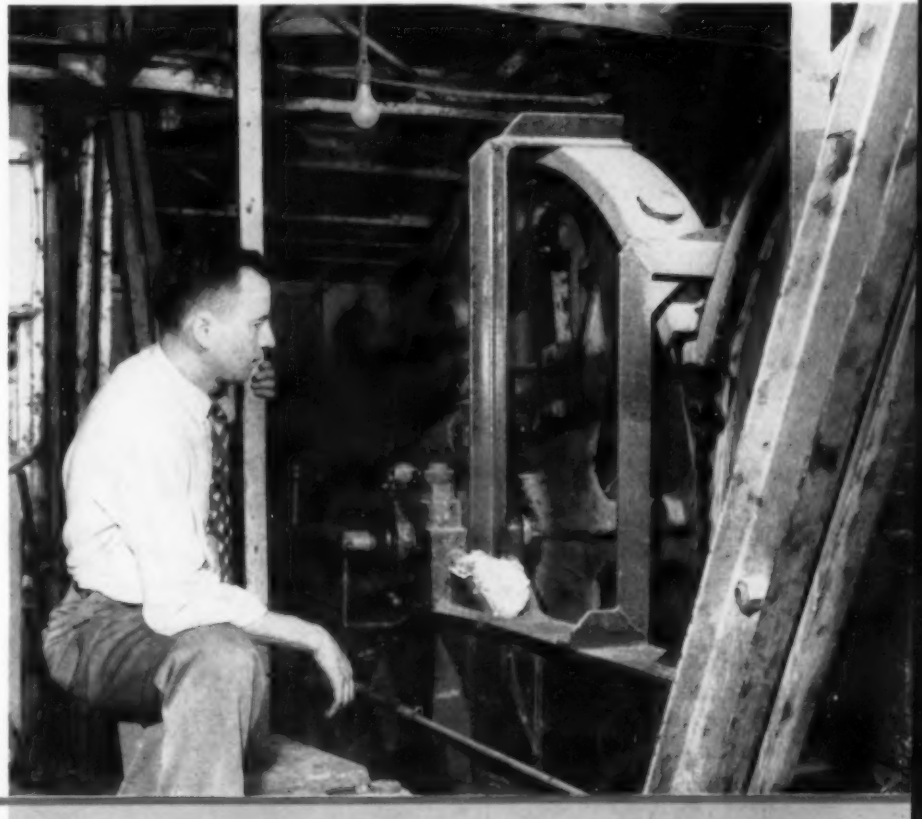
Viscous Lubricant for Marion dragline spur gear

A No. 7200 Marion dragline at Flamingo Mine, Fairview, Illinois, is a busy piece of equipment. Its jobs include removing overburden and laying fill for roadbeds. These are rugged chores carried on in all kinds of weather under tough operating conditions. To keep this dragline operating winter, summer, spring, fall, in dust, dirt, and mud, Flamingo Mine lubricates the vital spur gear with CALUMET Viscous Lubricant.

CALUMET Viscous is an adhesive lubricant manufactured specifically for such tough service as this spur gear job. It will not chip off in winter temperatures nor throw off during summer heat. It has the ability to withstand heavy shock loads, has high load carrying capacity. Its unique properties make it both heat and water resistant.

CALUMET Viscous Lubricant can be applied, without heating, by either gun, brush or swab, without scraping off previously used lubricants — two important advantages.

There is a complete line of CALUMET Viscous Lubricants. They are just a few of the extensive catalog of greases and lubricants available from Standard Oil. Like to know more about them? In the Midwest call your nearby Standard Oil lubrication specialist. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Ill.



R. E. Wright, Standard lubrication specialist, inspects Marion dragline spur gear. Before entering field service work Bob got his engineering degree from Michigan School of Mines. He has completed Standard's Sales Engineering School. Customers find this background and experience pay off for them.

STANDARD

STANDARD OIL COMPANY
(Indiana)

TAPER-LOCK SOLID STEEL CONVEYOR PULLEY

1

DRUM DESIGN
— maximum strength
— minimum weight

2

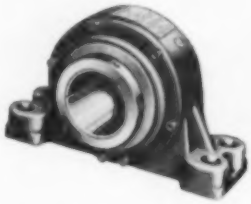
FULLY ENCLOSED
no dust — no dirt — no water

3

SUBMERGED-ARC PROCESS
— full strength in all welds

4

TAPER-LOCK BUSHING
— no walking on shaft
— easy on — easy off!



DODGE-TIMKEN ALL-STEEL PILLOW BLOCK

5

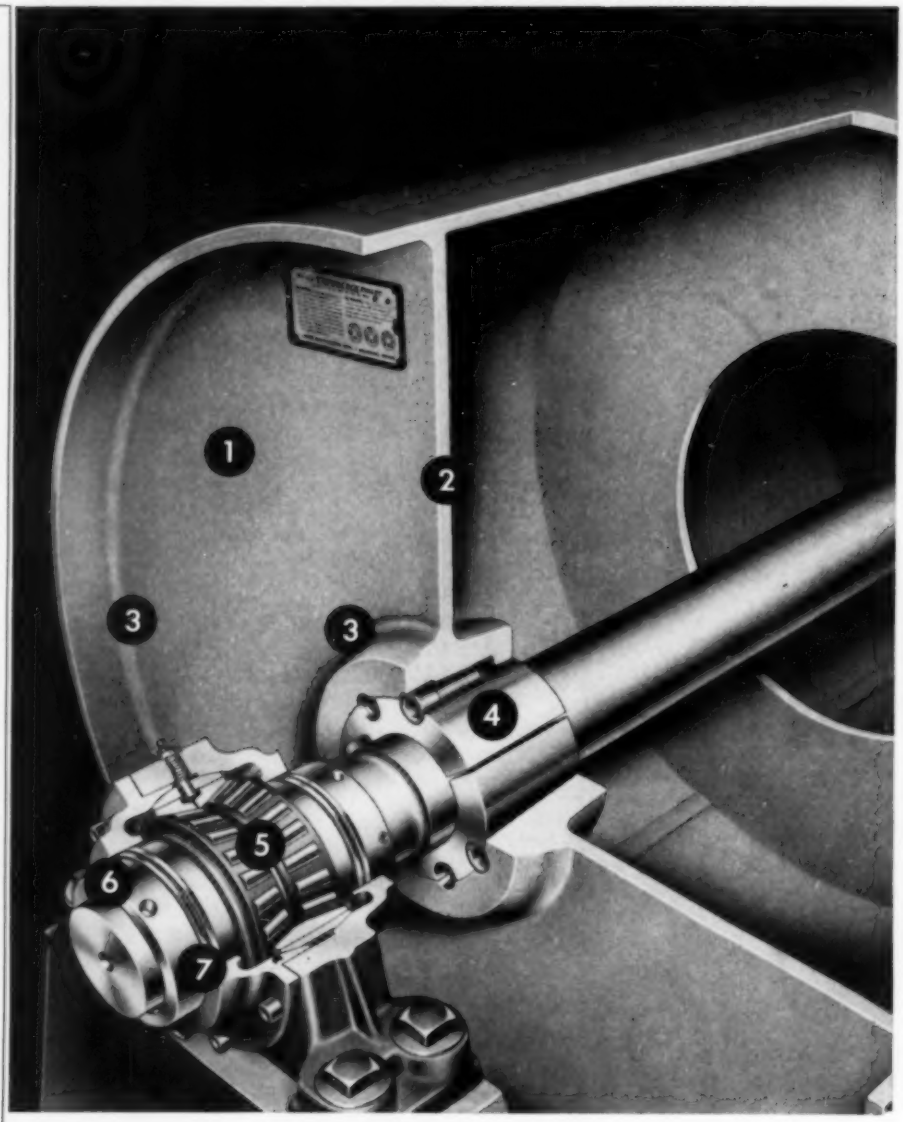
NEW HEAVY-DUTY TIMKEN ROLLER BEARINGS
— fully self-aligning

6

HEAVY-DUTY ADAPTER MOUNTING

7

Sealed both on and off the shaft with DOUBLE PISTON RINGS



Here's a heavy-duty combination for tough conveyor jobs!

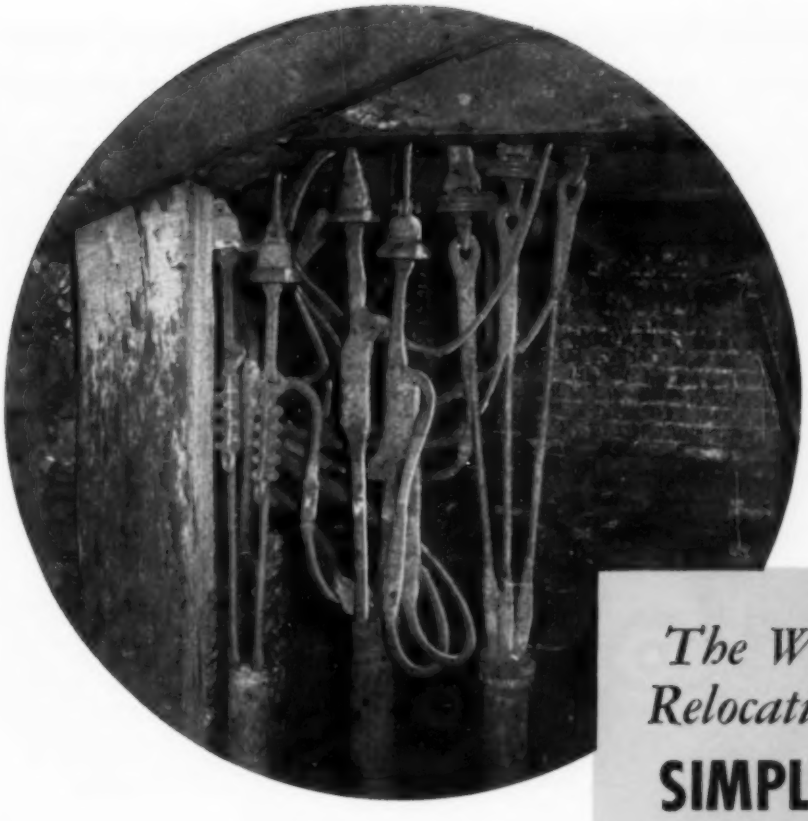
Pulleys from 6 in. to 8 ft. in diameter, all face widths. Bearings from 2 15/16" to 10" bores. Popular sizes stocked by our Distributors. Write for detailed information.

DODGE

of Mishawaka, Ind.

Call the Transmissioneer, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE MANUFACTURING CORPORATION, 3000 UNION STREET, MISHAWAKA, INDIANA



The Wear and Tear of Relocation Doesn't Harm

SIMPLEX-ANHYDREX BOREHOLE CABLE

Simplex-ANHYDREX Borehole Cable, carefully and properly pulled out of old boreholes, can be hung over again without risk of damaging its physical properties and its electrical performance.

ANHYDREX Cables can be pulled out and relocated because they have no heavy lead sheath.

ANHYDREX Cables were developed to take the place of lead-covered cables.

Both the armored and the rubber-jacketed types of ANHYDREX are lighter and much easier to bend than any lead-covered cable.

ANHYDREX insulation gives long, trouble-free service.

Built-in heat resistance of these cables defies deep mine temperatures.

ANHYDREX is the most nearly perfect water-resistant rubber insulation ever known.

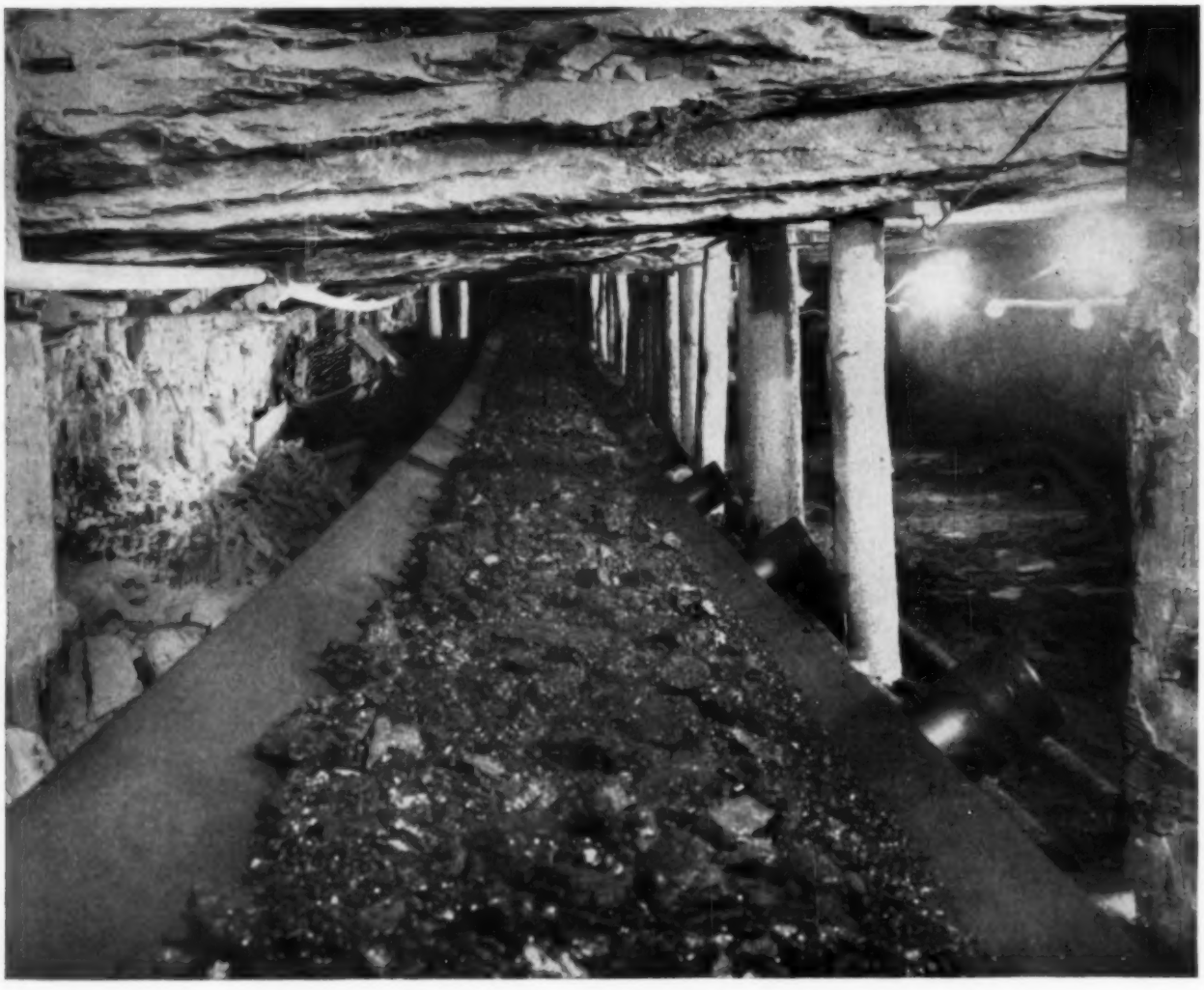
Special Simplex Borehole Cables can be made for use in mines where corrosive acid is extremely severe.

Write the address below for more details.

Simplex– ANHYDREX Borehole Cable

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

Barnes and Tucker Co. reports: **"Almost 10 miles of belting reinforced with Du Pont 'Cordura' helped increase production, cut expenses"**



NOW Du Pont "SUPER CORDURA" makes belts even stronger

Eight separate belting operations—nearly 10 miles of belts—are used by the Barnes and Tucker Co. of Pennsylvania in mining 4,000 tons of bituminous coal daily. And all of this belting is built with Du Pont "Cordura"* High Tenacity Rayon, for extra strength, less stretch, better troughing and training.

The company reports that the belts reinforced with "Cordura" have been an important factor in raising production from 2,500 to 4,000 tons daily. Manufactured by the Boston Woven Hose and Rubber Co., the belts currently operate 14 hours each working day. Performance has been outstanding, with little maintenance necessary. What's more, the use of conveyor belts saves the expense of cutting higher openings to lay track and run coal cars to the digging area. And the low stretch of Du Pont "Cordura" reduces expensive downtime for take-up and repair.

And now—there's an even stronger, tougher reinforcement available for conveyor belting—Du Pont "Super Cordura"* High Tenacity Rayon. A product of Du Pont research, this exceptionally strong rayon offers top performance under the most rugged conditions of use. Write us for the names of suppliers. E. I. du Pont de Nemours & Co. (Inc.), Textile Fibers Dept., Wilmington 98, Del.

*REG. U. S. PAT. OFF.

DU PONT *Super Cordura*
High Tenacity Rayon

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Imperial Strips with its 4th, 5th and 6th TD-24s Since 1950

SCALING STEEP SLOPES IN REVERSE, the 161 drawbar horsepower INTERNATIONAL TD-24 thunders down grade with loads like this on the *Bullgrader*® to rip off overburden, trees and rocks that cover a valuable 30-inch seam of coal as much as 60 foot underground.

Big INTERNATIONALS work fast to make removal of 20-60 feet of overburden profitable venture

Laying bare a 30-inch coal seam near Clearco, West Virginia, calls for removal of from 20 to 60 feet of overburden, but the Imperial Coal and Construction Company has made the operation a profitable one with INTERNATIONAL TD-24 crawlers.

Three TD-24s, the fourth, fifth and sixth the company has used on the strip since 1950, are currently at work on the hilly terrain. They work with four power shovels, doing the rough and tough pioneering work of ripping rocks and timber from the slopes until the big dippers can get into the act on level ground.

Partner Domenick Franciose fills in the facts about the company's power pick:

"There's no question about it—these INTERNATIONAL *TD-24s strip overburden faster than any of the other large crawlers. Our newest TD-24, sixth we've purchased since 1950, already has 1,000 hours on the meter. We find the TD-24s not only stand up but we particularly like their workability and balance. That balance pays off when we back our TD-24s up the steepest slopes during land clearing operations. We have our 7th TD-24 on order now."*

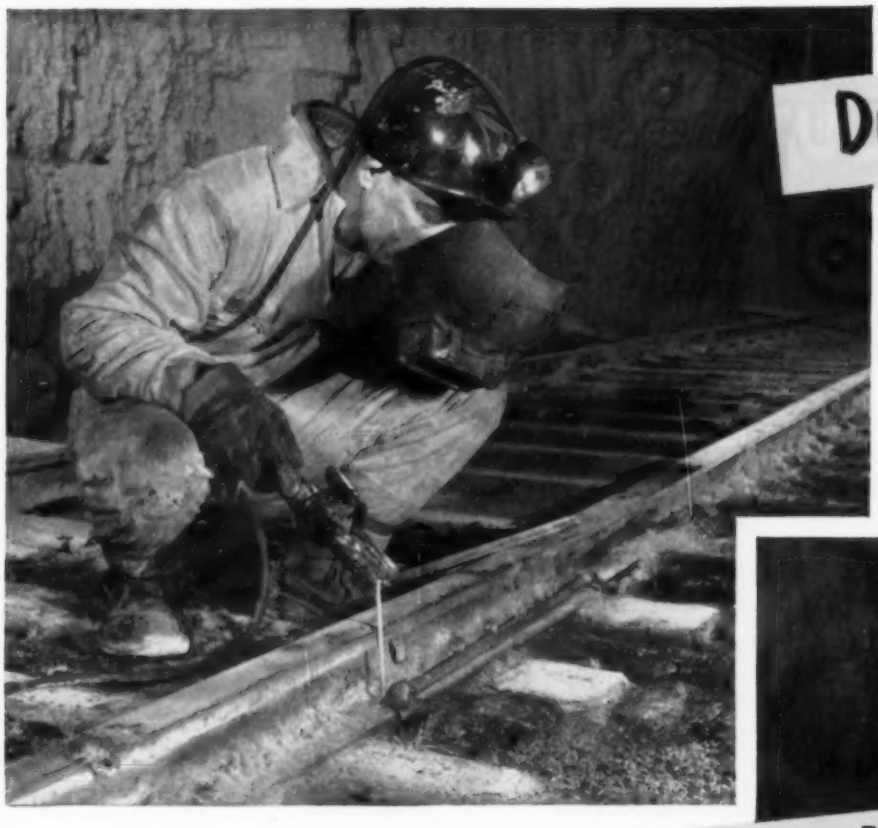
It sure doesn't take much time or money to get the low-down on INTERNATIONALS. Call your INTERNATIONAL Industrial Power Distributor for your demonstration. Spend an hour or a day watching it work, comparing it with your present power. You'll see the answer to profitable powering of your job.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL HARVESTER

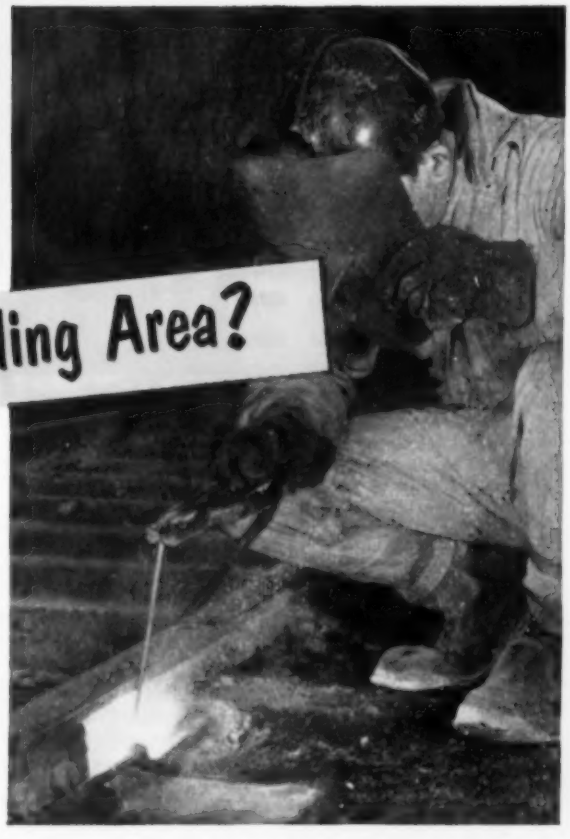
INTERNATIONAL®
INDUSTRIAL POWER

MAKES EVERY LOAD A PAYLOAD



Durability?

Everything about a Tigerweld BF-10 Rail Bond is rugged. The terminals are made of tough, heavy steel that can take punishment. They are butt-welded to the strand for permanence. You weld them to the rail with a solid steel-to-steel weld that holds permanently.



More Welding Area?

You can lay a lot more metal in the notch of a Tigerweld BF-12 than you can on other clamp-type bonds. A raised shoulder on the terminal forms a deep V-trough between the terminal and rail that assures you the best possible weld. It has the same rugged dependability that is built into the Tigerweld BF-10.

Something Special?

There's a rugged Tigerweld Rail Bond for every conceivable mining application. They all are built to take abuse . . . to help you maintain continuous electric service in the roughest kind of a job.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL • GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS Tigerweld Rail Bonds

USS

SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

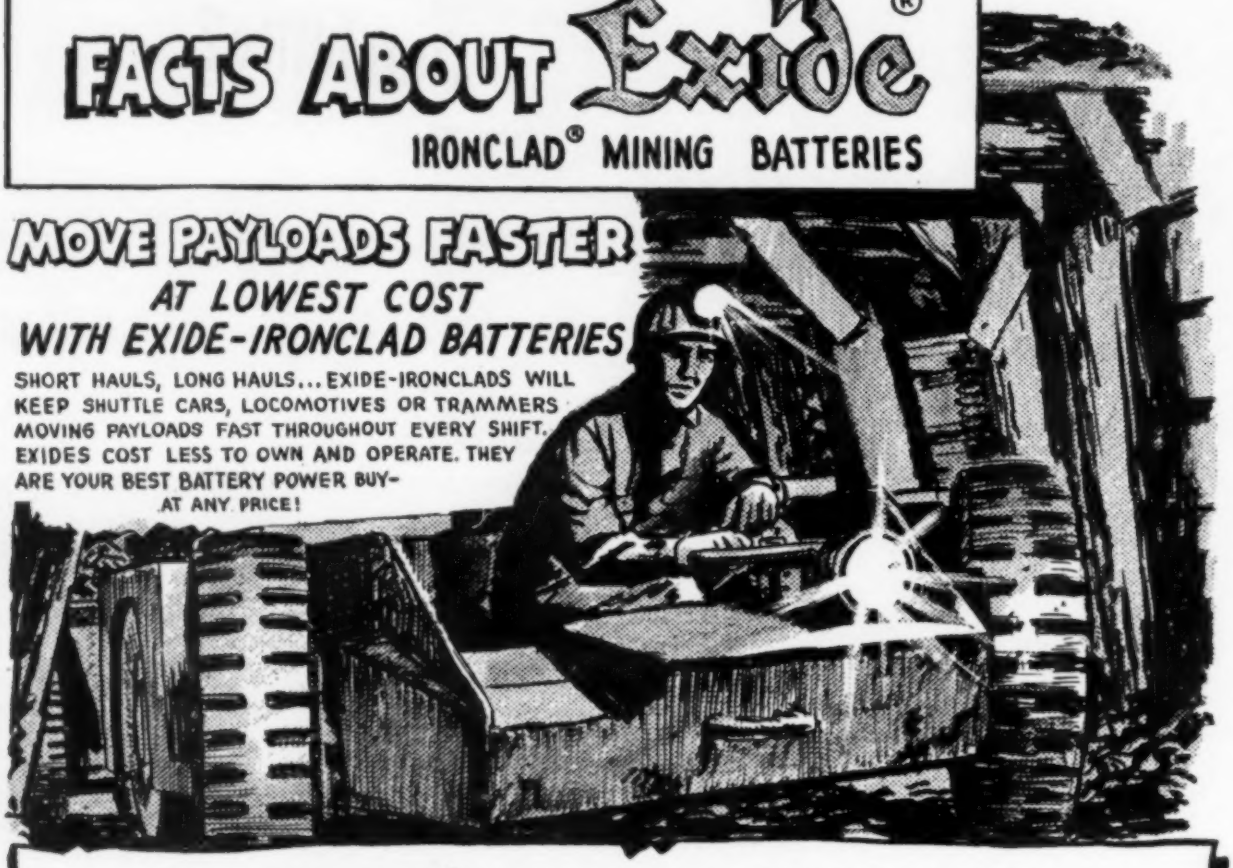
UNITED STATES STEEL

FACTS ABOUT Exide®

IRONCLAD® MINING BATTERIES

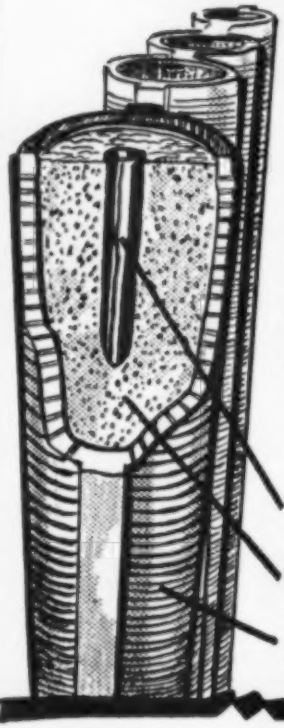
MOVE PAYLOADS FASTER
AT LOWEST COST
WITH EXIDE-IRONCLAD BATTERIES

SHORT HAULS, LONG HAULS... EXIDE-IRONCLADS WILL KEEP SHUTTLE CARS, LOCOMOTIVES OR TRAMMERS MOVING PAYLOADS FAST THROUGHOUT EVERY SHIFT. EXIDES COST LESS TO OWN AND OPERATE. THEY ARE YOUR BEST BATTERY POWER BUY— AT ANY PRICE!



NATURE'S IDEAL SHAPE

THE CIRCLE WORKS FOR YOU INSIDE AN EXIDE-IRONCLAD



SLOTTED TUBES INSIDE AN IRONCLAD KEEP ACTIVE MATERIAL IN FIRM CONTACT WITH CONDUCTING GRIDS OF THE POSITIVE PLATE... THIS GRID PROTECTION LENGTHENS LIFE OF BATTERY. THE SLOTTED TUBES EXPOSE MORE ACTIVE MATERIAL TO THE ELECTROLYTE... FOR GREATER POWER. FINE TUBE SLOTS HOLD MATERIAL IN CONTACT WITH GRID LONGER... RESULT, THE IRONCLAD'S ABILITY TO DO YOUR MINE HAULAGE JOB FOR A LONGER PERIOD OF TIME. THAT IS WHY

EXIDE-IRONCLADS

ARE YOUR BEST MINING BATTERY BUY—

AT ANY PRICE!

IRONCLAD POSITIVE PLATE

LET EXIDE HELP SOLVE YOUR MINING BATTERY PROBLEMS. ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS. ❷ WRITE FOR FORM 1982, A MANUAL ON MAINTAINING MOTIVE POWER BATTERIES.

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

Duff-Norton Jacks and Coffing Hoists

join to give you more complete lifting service from one source!

It seemed a logical move to combine into one organization the world's oldest and largest manufacturer of lifting jacks, Duff-Norton; and a leading producer of high quality hoists, The Coffing Hoist Company.

That's exactly what happened March 1 when Duff-Norton purchased The Coffing Hoist Company. Now, with the pooling of engineering skills and experience, the joining of sales departments and the combining of two complete lines of lifting tools, you can expect better service when it comes to lifting, lowering, pushing, and pulling jobs from either the floor or ceiling.

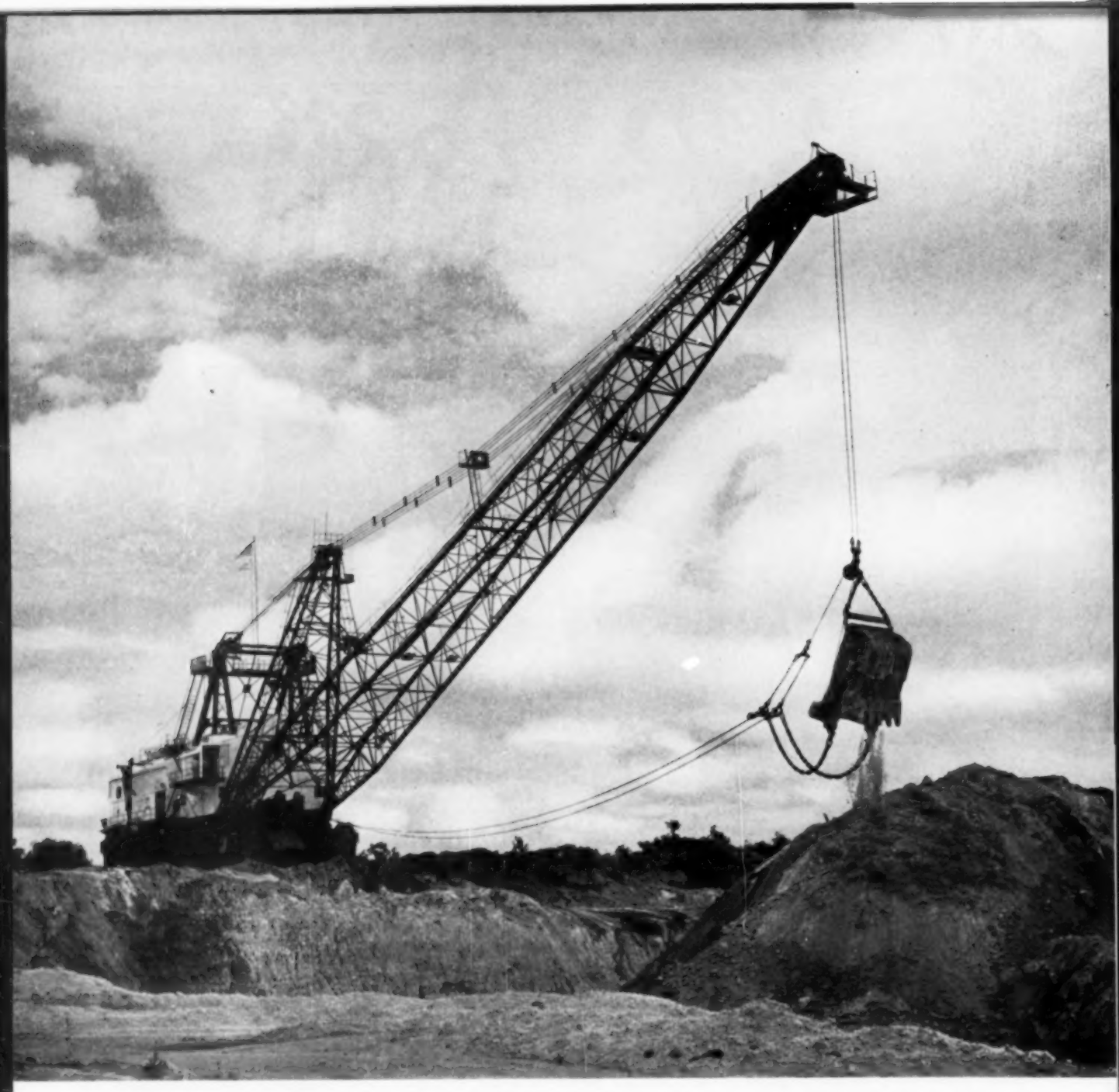
Josiah Barrett, the founder of Duff-Norton, invented the world's first ratchet lever jack in 1883. Today, the line of high-quality jacks includes some 203 different types and sizes of ratchet, screw, hydraulic, and air motor powered models from compact 3-ton capacity hydraulic jacks to giant 100-ton capacity air power jacks.

F. W. Coffing, who founded the Coffing Hoist Company in 1928, invented the first ratchet lever hoist and also developed the first portable lightweight electric hoist. Coffing hoists are recognized as high quality, low maintenance products. The Coffing line includes over 100 different sizes and models from 500 pound to 25 ton capacities in ratchet lever, standard and lightweight spur gear, and electric hoists.

See your local distributor or write for complete details on jacks to the Duff-Norton Company, Pittsburgh 30, Pennsylvania. For hoists, write to the Coffing Hoist Division, Duff-Norton Company, Danville, Illinois.

Duff-Norton *Jacks*
Coffing *Hoists*

Giving Industry A Lift Since 1883



Wire Rope at Work—Looking a bit like a prehistoric dinosaur, this huge dragline excavator gobbles up 22 cu yd of earth at a single bite. The mechanical monster is owned by International Minerals & Chemical Corporation, and it is shown here stripping overburden from rich phosphate deposits near Bartow, Fla. The company mines and processes the phosphate, which is subsequently used in fertilizers, stock feeds, and various industrial products.

Large-scale stripping of this kind places terrific burdens upon the steel cables. To withstand the high stresses and abrasive wear, the big excavator used two kinds of Bethlehem Purple Strand wire rope for the job shown above—1¾-in. 6x41 for the hoist lines, 2¼-in. 6x25 for the draglines. This combination assured not only the necessary strength, but the long life that kept rope expense at a minimum.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

It's costly to use more when only ONE is needed—

Gulf Mining Machine Lubricant

When you can simplify your lubricant storage and handling, stop application errors, and secure better protection with one lubricant, why use more? You can gain all these cost-saving benefits for most types of mining equipment by switching to Gulf Mining Machine Lubricant. It can often do the entire lubricating job at the face, a task which otherwise requires three or more different lubricants.

This exceptional lubricant is effective for pressure fittings, plain and antifriction bearings, crawler mechanisms, and gear boxes. It not only replaces several other lubricants but does an outstanding job because of its heavy body, excellent adhesiveness, and resistance to the washing action of water.

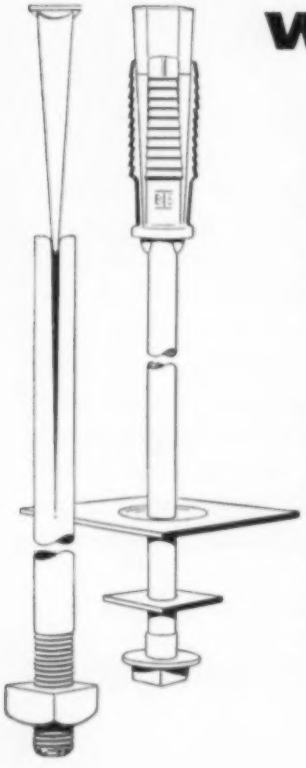
Why not have a Gulf Sales Engineer demonstrate the time-saving, cost-cutting advantages of Gulf Mining Machine Lubricant on your equipment? Contact him today at your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, 1822 Gulf Building, Pittsburgh 30, Pa.

GULF

THE FINEST PETROLEUM PRODUCTS FOR YOUR EVERY NEED

Up Goes Production...

When Roof Bolts Go In



When you equip your mine with roof bolts, production is increased because of the wider openings and clearances, and increased room in which to operate mechanized equipment. And with large, old-fashioned supports out of the way, ventilation is improved.

Roof bolts make larger work area possible, and permit a tight, sound roof, because they consolidate strata into a single-unit thick beam. With such roof control, the possibility of serious roof falls is minimized.

4 Types of Bethlehem Roof Bolts

Bethlehem produces four types of roof bolts, to enable operators to increase production, and promote safety.

SLOTTED BOLT. This husky 1 in. bolt has a centered slot which is made by forging, without any loss of metal. Other end of bolt has 5 in. of rolled threads. Bolt is used with steel wedge, which is forced deep into slot, expanding the bolt-ends, when bolt is driven in 1¼ in. hole. Bolt has truncated-cone point to prevent thread damage. Normally furnished with American Standard regular square nut, which is tightened against roof plate.

SQUARE-HEAD BOLTS. Three types: a ¾ in. carbon-type, and a ⅞ in. high-strength bolt, each with breaking load of 20,000 lb; also a ⅞ in. high-strength bolt with minimum breaking load of 40,000 lb. The ¾ in. and ⅞ in. bolts can be used with Bethlehem's matching-halves Type F expansion shell or the 4-leaf Type C expansion shell. The ⅞ in. bolt is for use with the Type F shell in 1½ in. hole.

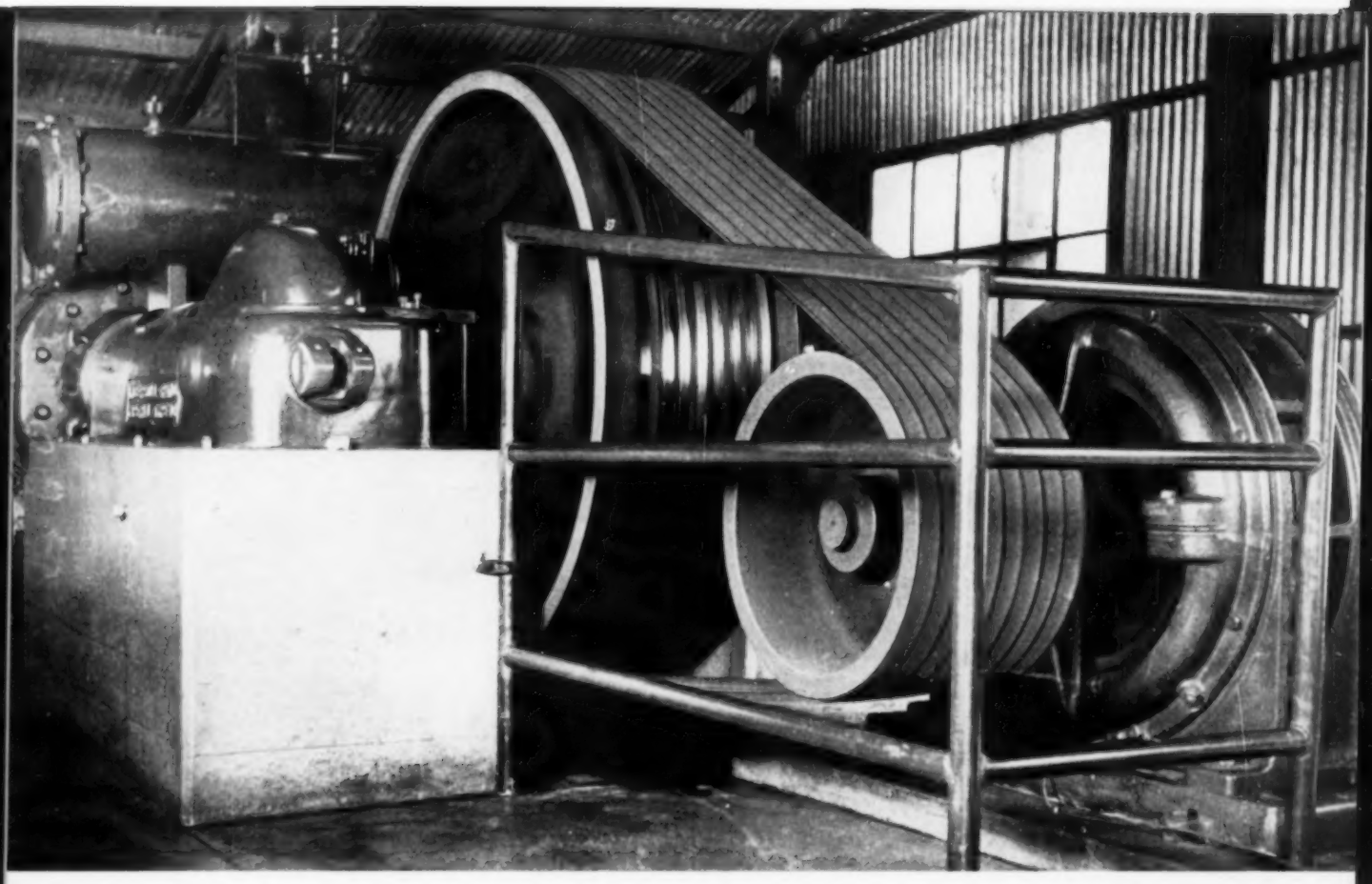
HARDENED WASHERS. Bethlehem's hardened washer for use with headed bolts reduces the friction between bolt head and roof plate that occurs when high tension in the bolt produces excessive bearing pressure. With this washer, impact wrenches can be used freely, without galling or tearing of metal.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

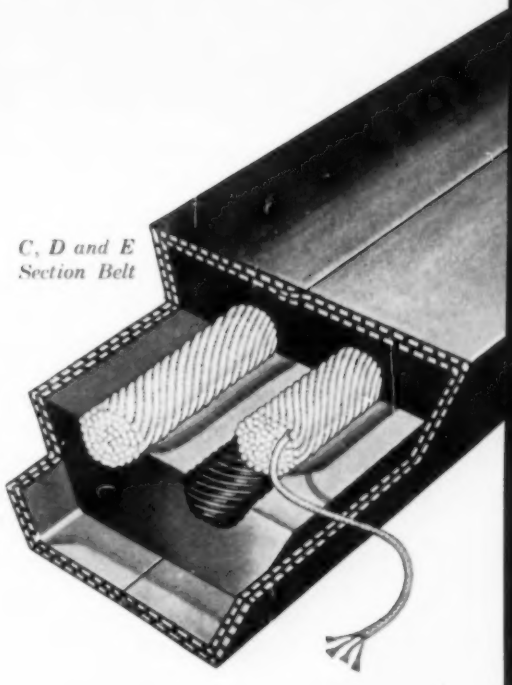
BETHLEHEM STEEL



Thermoid Multi-V Belts cut operating costs

There's a Thermoid V-Belt for every mining application. Every belt is *pre-stretched* to provide longer service and maximum power transmission without slippage. Thermoid C, D and E sections are rayon-grommeted for brute strength and extra flexibility that withstands repeated shock loads. The entire belt is vulcanized into a solid unit that resists moisture, abrasion, internal friction and heat.

Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. To meet the exacting requirements of mining service, your Thermoid Distributor carries a complete line of Thermoid Multi-V Belts, Hose and Conveyor Belting. Call him or write direct for complete information.



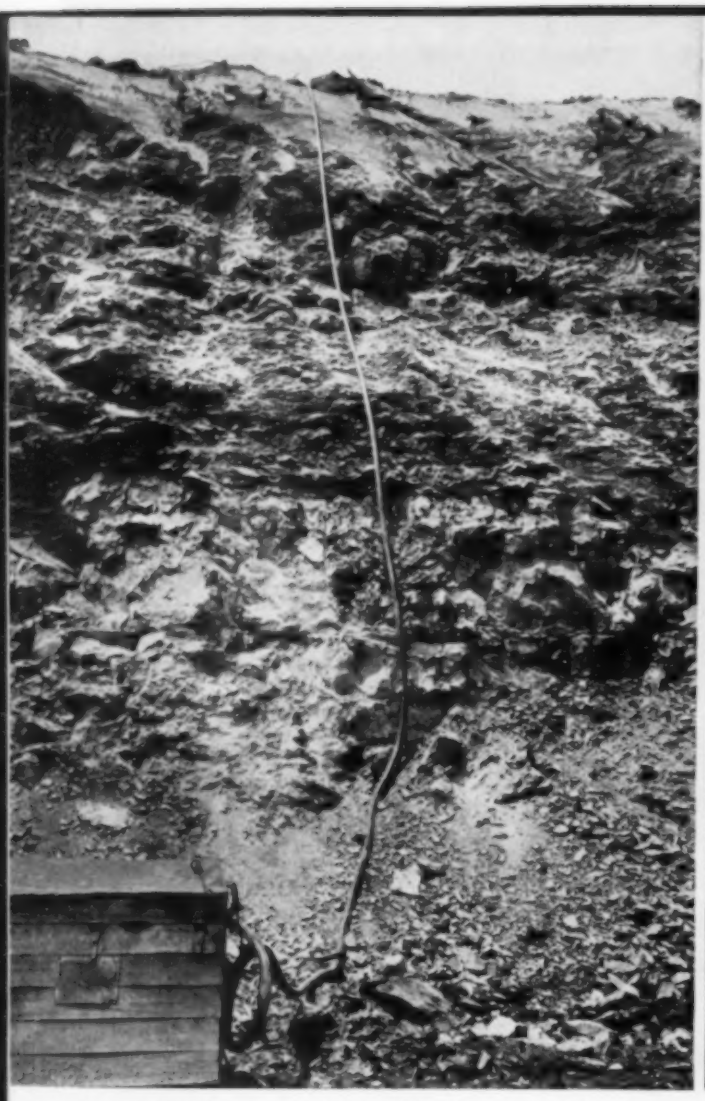
C, D and E Section Belt

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



SPECIALLY DESIGNED for rugged conditions like this, Anaconda butyl-insulated Mine Power Cable delivers maximum service and safety.

OPEN PIT OR UNDERGROUND, Anaconda butyl-insulated Mine Power Cable offers exceptional mine water- and abrasion-resistance.

FOR YOUR PROTECTION—

We proved this power cable in our mines

Being miners ourselves, we know mining problems. As both miner and cable manufacturer we're able to do something about them—by *designing* cable to meet problems only miners can know . . . by testing this cable in *our own mines* under actual field conditions.

FOR MINE POWER CABLE

Our firsthand mine experience has helped us build a sturdy cable that cuts down-time. Butyl insulation gives this cable long-aging characteristics, improved resistance to moisture, ozone and heat. Neoprene jacket—rugged, tough—has real flexibility, and resists rock-cutting, impact, flame, sun, and corrosive mine water.

Your Anaconda Distributor has full facts and can help you choose the cable best suited to meet your needs. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 55422

*Trade Mark

ANACONDA®
MINE CABLE

FLAT-TWIN CABLE

Improved stranding, new insulation, new grounding wire, and neoprene jacket make this a superior cable for shuttle cars, continuous miners, loaders, drill trucks, cutters.

POWER CABLES

Anaconda Types W & G are rugged, sturdy and long-lived. Used for mine power, shovels, continuous miners, loaders, drill trucks, cutters.

SHOVEL AND DRILL CABLES

Securityflex* Types W and G are used with small shovels, self-propelled drill trucks, pumps and a-c mining equipment. For higher voltages, Type SH cables (shielded) are recommended.

SECURITYFLEX CORDS

Unexcelled for strength, wear resistance and long life. Type SO cords (heavy-duty) provide superior service on remote control and hand drills.

TROLLEY WIRE

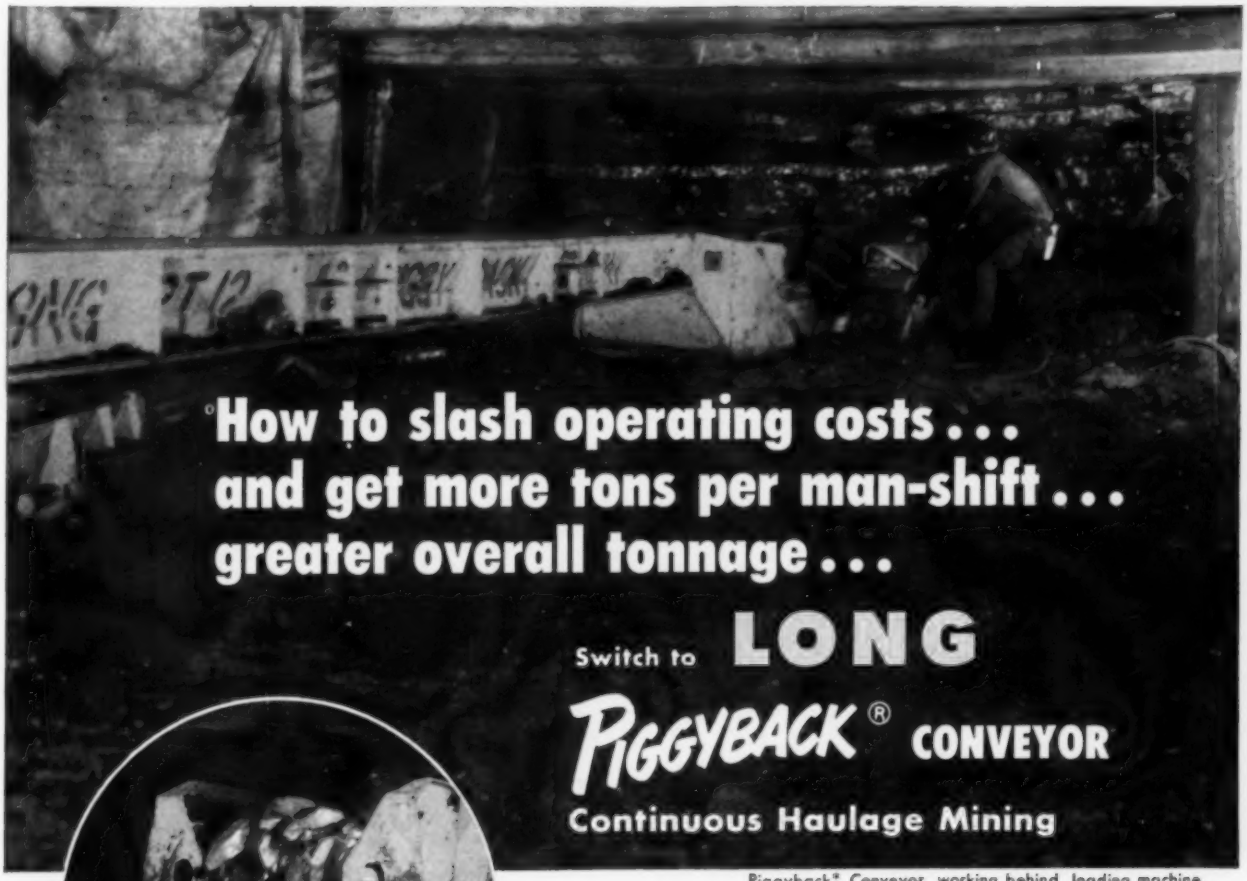
FEEDER CABLE BARE OR INSULATED

TELEPHONE WIRE

SHOT-FIRE CORD

WELDING CABLE

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



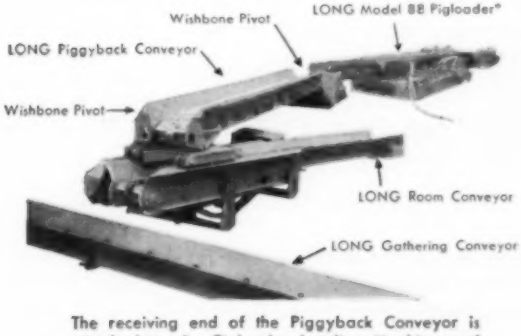
How to slash operating costs . . . and get more tons per man-shift . . . greater overall tonnage . . .

Switch to LONG PIGGYBACK® CONVEYOR Continuous Haulage Mining

Piggyback* Conveyor working behind loading machine.

Coal discharging from Piggyback Conveyor to Long Room Conveyor. Note how Piggyback rides on top of pan line.

Units of the Piggyback Conveyor System



The receiving end of the Piggyback Conveyor is attached to the Pigloader Loading Machine and follows it as it moves. Thus, the operator can devote his full attention to loading. Wishbone pivots make possible continuous haulage at 90° angle breakthroughs and dolly action permits long advances without pan-ups.

The Piggyback Conveyor system provides uninterrupted haulage from the face . . . eliminates costly loading delays common with "stop-and-go" transportation of other systems.

Every day more and more companies are learning that Piggyback Conveyor mining pays off in greatly increased production at greatly reduced operating costs. In fact, at many mines, this unique system has meant the difference between operating at a profit instead of a loss.

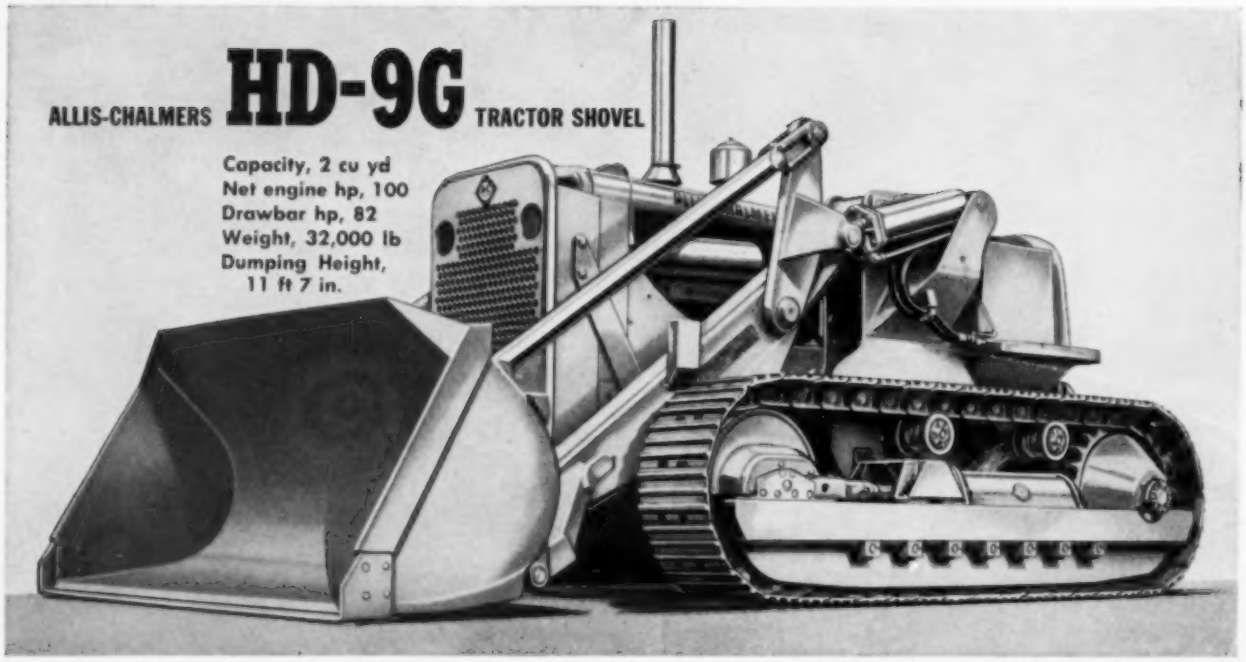
With proved, practical Piggyback Conveyor mining, six hours or more loading time per shift is not unusual. Coal is loaded and moved out in a steady, continuous flow—with no down-time waiting for intermittent transportation. The result: more tons per man—higher total tonnages per section. What's more, capital investment per ton for installing the Piggyback Conveyor system is much lower than for any other continuous mining method.

There are, of course, other reasons why low-maintenance Piggyback Conveyor mining is unequalled in efficiency and economy. We'll be glad to give you complete information, without obligation.

*Trade Mark

For complete details or a demonstration, write us today!

The LONG Company
OAK HILL, W. VA.

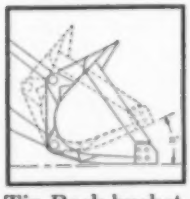


POPULAR 2-YD HD-9G TRACTOR SHOVEL NOW OFFERS

Higher Work Capacity

Design refinements in the Allis-Chalmers HD-9G now make it even more productive than ever. First, the net engine output has been increased to 100 hp, with 23,000 lb of push for extra crowding and digging ability, fast work cycles.

Streamlined bucket design now helps roll in large loads with less tractor effort. The back of the bucket has been brought forward and the sides extended to cut spillage, put more pay load where it's wanted. Cleaner dumping with the new bucket saves the operator time and effort shaking out loads.



A new addition to the wide variety of attachments available for the HD-9G Tractor Shovel is the Tip-Back bucket which allows the operator to roll the bucket back approximately 25° at ground level. Ideal for handling greater capacities of loose stockpiled materials, the Tip-Back bucket can be carried lower to the ground for greater stability . . . can load bulky objects easier.

New-type ceramic master clutch lining reduces lever pull, makes it easier for the operator to do more. The new HD-9G helps the operator do more in other ways, too — giving him full vision, fast and easy control, cleaner platform and more comfortable seat from which to work, and more working time with truck wheels, support rollers and idlers that need greasing only once every 1,000 hours.

Lower Operating Cost

Design improvements also add longer life to the HD-9G under all work conditions. Heavy box-section booms are 50 percent stronger, assuring proper alignment even working in the toughest materials. The low design of the new HD-9G combination stabilizer and cowl not only offers easy accessibility for maintenance and service, but contributes to maximum operator vision. New ceramic master clutch lining operates longer between adjustments, increases clutch life.

Hydraulic system provides new maintenance simplicity, safety of operation, as well as improved visibility. With new-style tank, there are few external fittings, greatly reducing possibility of outside leaks. Magnetic filters and suction-line screens protect the entire system from damaging grit. New, improved hydraulic pump is designed for long life as well as fast and accurate bucket action.

Heavy-duty truck wheels and idlers are available for particularly tough working conditions. One-piece, full-length main frame permits unit construction so that major assemblies can be removed without disturbing adjacent units, putting tractor back on the job in hours rather than days.

☆ ☆ ☆

See your Allis-Chalmers dealer for further information on what the HD-9G can do for you — or a demonstration right on your job.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

SMALL but MIGHTY!

Compton Budget Model 28 Coal Auger

Ideal for narrow pits and short benches

Here it is! The mighty mite of the Compton Coal Auger family—Model 28—designed, like its big brothers, to raise production figures and cut operating costs—This new machine will produce up to 50 tons per hour. Only 28 feet long, light weight and easily moved from pit to pit with optional available tail wheel assembly, this Compton Coal Auger enables a 3 man crew to efficiently handle tough mining assignments in pits and/or benches as small as 30 feet—augering to a depth of 150 feet.

Model 28 incorporates many of the time-proven features found only in Compton Coal Augers:

1. Model 28 with all size cutting heads drills coal within 4¾" of the bottom—assuring maximum recovery.
2. Easily accessible auger sections racked on the frame.
3. Elevating conveyor is integral part of the machine.
4. Hydraulic jack legs (with self-leveling pontoons) allow drilling up to 150 feet without misalignment.
5. Single or vertical overlapping holes can be drilled for greater recovery.
6. Easy to move along working face of highwall.

It will pay you to look into the advantages of the Compton Coal Auger. A Compton representative will help you review your property for the proper auger application.

GENERAL SPECIFICATIONS
MODEL 28

Length: 28 feet
Weight: Approx. 25 tons
Carries 12—12½ ft. auger sections
Required pit width: 30 ft. min.
Power: 150 hp Diesel engine
Hydraulic Frame Jack Lift: 54 inch
Auger Diameter: 44" to 28"
Max. Drilling Depth: 150 feet

Cutting Head: Compton non-clogging type with built-in spider bearing assembly provides straighter drilling with less frictional drag.

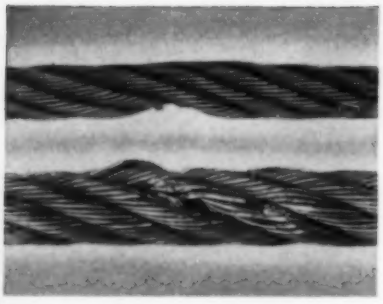
CLEVELAND COAL SHOW
SEE THIS MACHINE
MAY 16-19 LOT 550

Compton, Inc.
ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

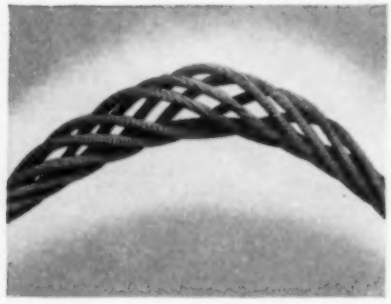
VISIT BOOTH 329
CLEVELAND COAL SHOW
MAY 16-19

BOX 1946 • TELEPHONE 4-6384 • CLARKSBURG, WEST VIRGINIA

Tuffy® tips on preventing

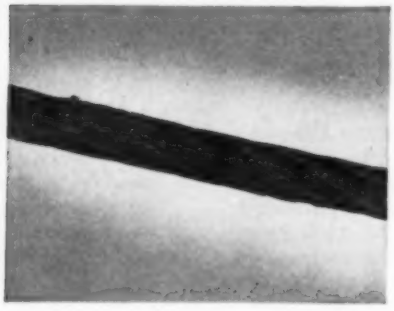


These two photos show what happens when rope is run over or struck by a hard object and crushed. The damage to the strands greatly reduces the service life so carefully built into the rope.



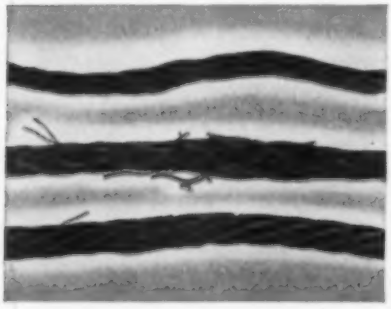
Sudden release rebound from an overstressed condition may often cause birdcaging. Throwing a loop into the rope is also a major cause of birdcaging. Lang Lay ropes in particular are vulnerable to this abuse.

Severe corrosive water conditions caused rust and corrosion to produce a one-strand break in this rope. Lubrication during the time the rope was in service would have retarded the damage . . . added greatly to the rope's life.

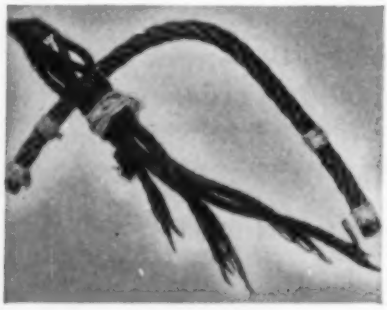


If broken in improperly, high strands like these may result. When installing, make sure that the fabricated relation between *strand with strand* and *strands with core* are not changed.

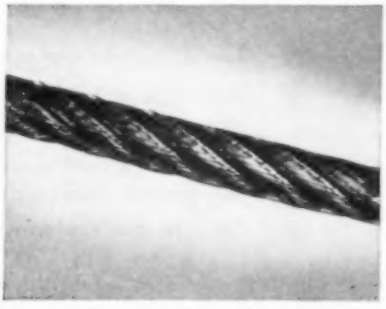
Nailing a wire rope through the core often causes many undesirable results. The wires and the core are badly damaged. A high strand may develop near the end or many feet away.



Here are three types of open kinks, all resulting from mishandling of wire rope. Guard against kinks by winding rope properly on the drum, and *never* pull a loop smaller, always enlarge it then straighten out the rope.

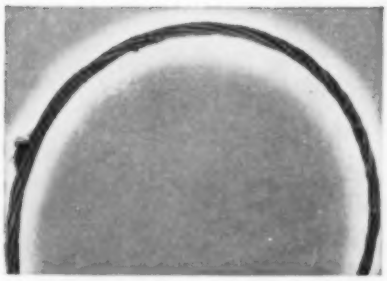


The start and finish of doglegs; the end being the point when all the wires on one side of the rope were worn through. Anything, such as a pulled loop, that causes a permanent bend or "set" will result in a dogleg.



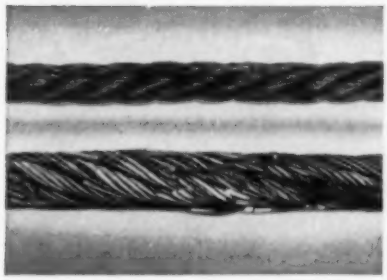
While different wire rope is constructed to resist abrasion to different degrees, improper use leads to injury. Watch for abrasion and when it begins to show locate the point where it is occurring and correct the cause.

damage to *Wire Rope*



When a popped core occurs, continued use causes the rope lay to lengthen out considerably. This displacement of the core is usually caused by load tension being suddenly removed from the rope.

Here is an example of excessive pinching in the sheave grooves. This rope lasted through only 1½ hours of service. To prevent pinching, make sure grooves are not worn deep and that the bearing surface is sufficiently large.



Excessive drum crushing like this occurs at points of cross-over or when rope is wound unevenly. Check for even winding of each layer on the drum to prevent crushing of this type.

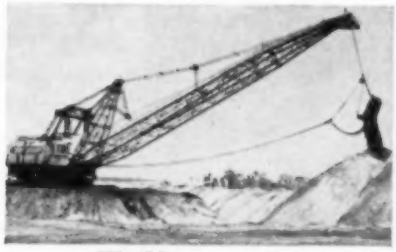
Put the Knowledge of Specialists to Work on Your *Wire Rope* Problems

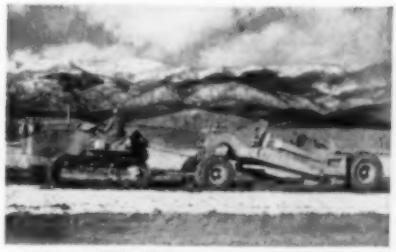
Their years of field-testing experience and solutions arrived at and proved both in the field and in our outstanding wire rope laboratory are yours to make use of whenever a rope problem confronts you.

In addition to standard wire ropes, Union Wire Rope specialists have produced a family of wire ropes for special purposes. Ropes that give you the construction, type of steel and characteristics best suited to each particular job for which each of the Tuffy Wire Ropes is especially designed and constructed.

The Tuffy Ropes they have developed make ordering easy and *sure*. Next time you want wire rope, just . . .

Say Tuffy—No Need For Complicated Specifications





Tuffy Dozer Rope
Tailored to retard the severe destructive forces imposed by small winch drums and tough terrain. 1/2" and 9/16" on 150 ft. reels.

Tuffy Dragline
Has an inside flexibility for easier casting and better spooling and enlarged outside wearing surface to take more abrasive wear.

Tuffy Scraper Rope
Small winch drums, heavy line pull, rapid running lines and slack take-up shock call for this special rope to cut down-time and curb rope waste.

Tuffy Slings
A 9-part machine-braided wire fabric construction which defies distortion damage and breakages. With Tuffy Hoist Lines, they give you a stay-with-it team of balanced performers.

Tuffy Slusher Rope
A special 3 strand, non-collapsing rope to over-match the four rope killing conditions imposed by slusher loading operations. Easily knotted or eye-spliced for continued service.

Your Union Wire Rope Distributor Is Good At Solving *Wire Rope* Riddles. When you have a wire rope problem, give your Union Wire Rope distributor a call for hurry-up service. Chances are you'll find he has the correct answer at hand—because part of his job is figuring out how your equipment can give you the best operation, at the lowest operating cost! Feel free to call on him anytime.

union *Wire Rope* **corp.**
2130 Manchester Avenue, Kansas City 26, Mo.

• 2-M *Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric*

every time you use Electricity,

you burn COAL!

Almost all electricity produced by Appalachian is generated with steam produced by burning coal. In this sense, electricity *is* coal — *Coal By Wire!*

This year, Appalachian will buy and use 3½ million tons of coal from the region it serves.

The labor required to produce this coal will be equal to 2000 people working 40 hours per week for 50 weeks — and the wages and salaries required to produce it will amount to $9,000,000.

These coal-for-electricity dollars circulate through communities, creating sales and boosting production . . . paying other wages and salaries . . . paying taxes to provide public benefits . . . finding their way into churches and charities. These are dollars which create better living for everybody.

Every time you use electricity, you burn coal — and help improve the economy of your community and state.

Electricity is coal — *Coal By Wire!*

THIS ADVERTISEMENT is one in a series published in 85 daily and weekly newspapers in the area served by Appalachian.

Appalachian ELECTRIC POWER COMPANY

AMERICAN GAS AND ELECTRIC SYSTEM

High Production and Lower Maintenance–

You Get BOTH with "Eucs"

Built for tough off-the-highway service, Rear-Dump Euclids have increased production and reduced hauling costs on scores of open pit mining and quarry operations. Ability to deliver "plus" performance year in and year out has made "Eucs" the accepted standard for comparison . . . here are some of the reasons why:

RUGGED SIMPLICITY

Designed and built for long life and low maintenance cost. All of Euclid's experience and facilities are devoted to specialized off-the-highway earth moving equipment.

CAPACITY

Euclids have payload capacities of 10, 15, 22, 34 and 50 tons. Because they are matched to various sizes of loading and crushing equipment, "Eucs" provide a well balanced operation for open pit haulage and increase the efficiency of the loading unit.

POWER AND SPEED

Powered by diesel engines of 125 to 600 h.p. "Eucs" have top speeds with full payload, up to 36 m.p.h. Five and ten speed transmission, or torque converter with semi-automatic transmission available. The favorable ratio of horsepower to payload means more pay tons hauled every trip.

VERSATILITY

"Eucs" are efficient for moving any material on any length of haul; handle overburden, rock, coal, ore and other materials loaded by shovels, draglines, transfer hoppers and mobile loading equipment.

If you are interested in higher production at lower cost, have your nearby Euclid Distributor show you what "Eucs" are doing on work similar to yours. He'll be glad to make a hauling cost estimate for your job—no obligation, of course.

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

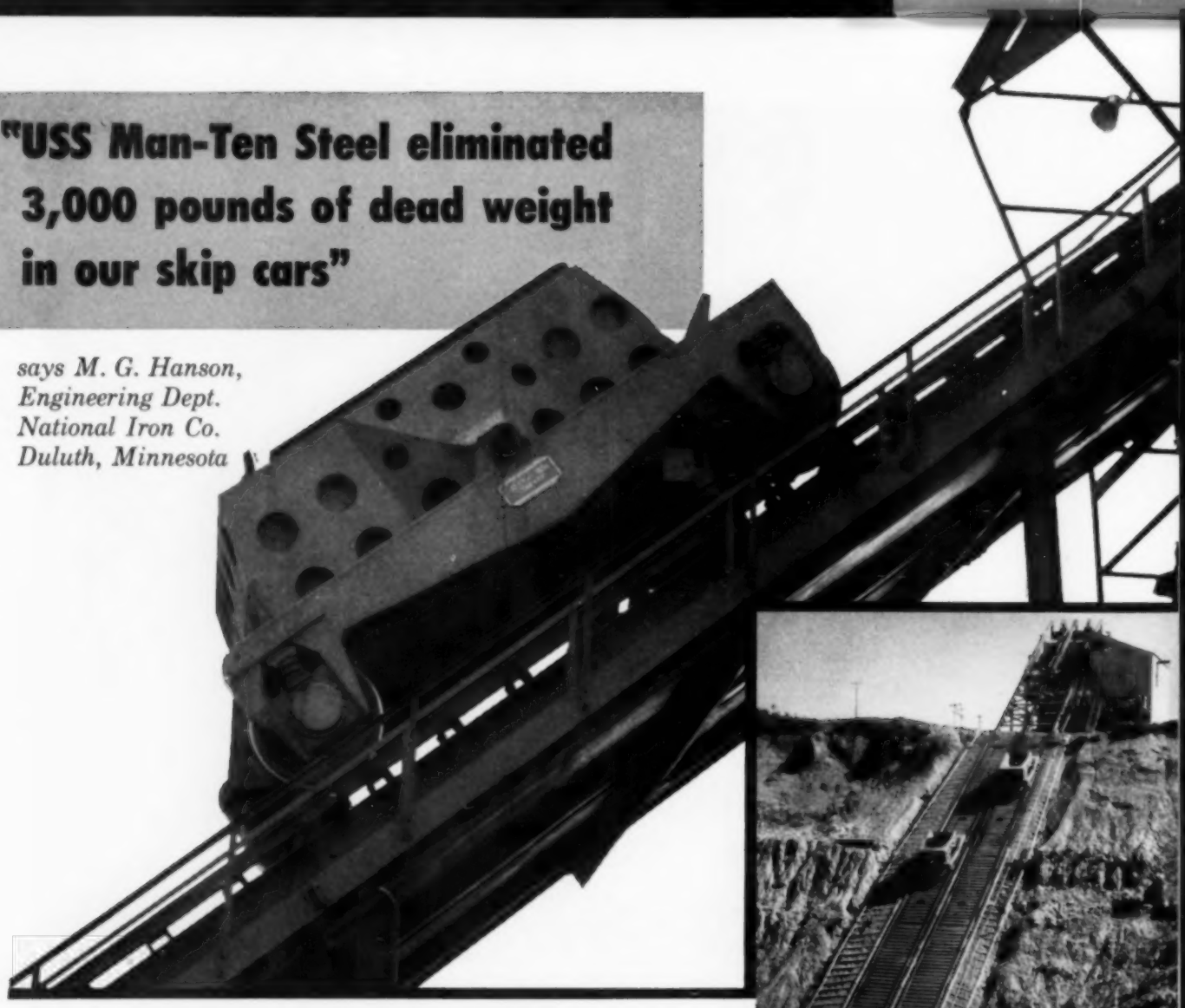
Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

"USS Man-Ten Steel eliminated 3,000 pounds of dead weight in our skip cars"

says M. G. Hanson,
Engineering Dept.
National Iron Co.
Duluth, Minnesota



Rockover Skip Cars have to be tough, durable and as light as possible. They run up and down steep inclines almost continually. And because they're dump-type cars they have to resist abrasion.

"Cut down the weight of skip cars," says Mr. Hanson, "and they move faster, carry bigger payloads and require smaller, less expensive hoisting equipment. We accomplished all these things by using USS MAN-TEN Steel in our skips. Because this steel is extra strong we are able to use it in thinner sections to reduce weight, and at the same time maintain the high strength required of our heavy duty cars.

"Here are three reasons why we used USS MAN-TEN in our skip cars: it's easy to work, it's easy to weld, and it resists corrosion."

An accident proved why Man-Ten is best.

One day when a loaded car was halfway up the incline the power failed. Because the brake arrangement had not been set for automatic emergency operation the loaded car crashed to the bottom, and the empty car, used to help counterbalance the load, sailed over the top of the incline and landed 300 feet away. What happened? The loaded car suffered only a bent frame and was returned to service immediately. The empty skip was bent and distorted, but there was no breakage. After being straightened in the repair shop it too was returned to service.

United States Steel produces three different grades of USS High Strength Steel—COR-TEN, MAN-TEN and TRI-TEN—each having distinctive characteristics and each recommended for certain end uses where its specific properties will assure longer service and greater over-all economy. All three grades have a yield point 50% higher than carbon steel and all offer properties which allow greater strength and toughness to be built into the vital parts of machinery, equipment and structures most prone to failure.

In the mining industry these steels can be used to replace carbon steel in the vital parts of mine cars, dozers, shovels, draglines and other such equipment to increase service life without increasing dead weight. And if the use of thinner sections is possible, they can (1) reduce equipment weight without reducing its strength, or (2) increase the size and capacity of equipment without increasing the total weight or the power needed to move it.

For more information, write or call our nearest office.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS HIGH STRENGTH STEELS

USS

UNITED STATES STEEL

ROEPRENE MINING CABLE

YOU WANT

FLEXIBILITY,
EXTREME TOUGHNESS,
RESISTANCE TO WATER, OIL AND OZONE,
MAXIMUM LIFE...
IN SHORT,

YOU WANT

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 5216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2 [illegible]

"Tire costs below a mill-per-mile"

says Guy Cooper, Cooper-Jarrett, Motor Freight, Chicago

"In a multi-million mile operation like ours, a fraction of a mill-per-mile means real savings. Our most recent records show that U. S. Royal Fleetways have enabled us to keep our tire costs below a mill-per-mile..."

Far Lower Cost Per Mile!

cracking. Special ROYAL CORD processing pre-stretches the Nylon or Rayon, reducing "tire growth" while maintaining the cord's natural shock absorbing strength. Exclusive PYRAVIN bonding solution surrounds each individual cord—fortifies it against heat and friction.

Today—no matter what your trucking job—there is a U. S. Royal Truck Tire capable of doing it better and at lower cost. And wherever you go, there is a U. S. Royal Dealer to give you expert tire service. Ask him to show you *why* truckers report they're *well ahead* with U. S. Royal!

ROYAL TRUCK TIRES

Never leave dependability out of your fuel picture

A sailboat has no choice—it must depend upon an undependable wind for locomotion. Fortunately, you have a choice in fuels for your firing system. Select the fuel known for *complete* dependability—Bituminous coal! It's the one fuel which gives you:

Dependability of Supply—Bituminous coal provides, for centuries to come, an inexhaustible source of low-cost heat and energy. The vast Bituminous fields served by the B&O contain a great variety of outstanding coals for every purpose.

Dependability of Cost—Cost is kept low and stable thanks to the advancements made by modern mechanized mining. And coal is economical and safe to store.

Call on our Coal Technical Service! You will receive authoritative information on how to select the right Bituminous coal for your specific firing job . . . how to make the most of your fuel dollar. *Ask our man!*

Write: COAL TRAFFIC DEPARTMENT
BALTIMORE & OHIO RAILROAD
BALTIMORE 1, MARYLAND

BITUMINOUS COALS FOR EVERY PURPOSE

BALTIMORE & OHIO RAILROAD
Constantly *doing things*—better!

LINKING 13 GREAT STATES WITH THE NATION — B&O

FACING A TOUGH PROPOSITION?

you can beat it

with **JALLOY**

JALLOY HEAT-TREATED STEEL PLATE BEATS WEAR DUE TO IMPACT AND ABRASION

Jalloy Plates outlast other steels by margins of 4 to 1

Jalloy Aprons in Tyrock screen last 3 times as long as other steels

Jalloy lowers maintenance costs on ore and coal conveyors

Jalloy provides longer wear with less repair in truck bodies

Jalloy Heat-Treated Plate is the special purpose steel that is heat treated to provide longer wear on applications where impact and abrasive conditions are severe.

In comparison with other abrasion-resistant steels as well as mild steels, it gives optimum results when heat treated, to a Brinell hardness of 340 and up. Jalloy permits savings in steel costs, maintenance, and repair. Furthermore, it is easily welded. Jalloy is available in three grades—1, 2, and 3 to meet various service requirements.

J&L STEEL

Jones & Laughlin

STEEL CORPORATION – Pittsburgh

Complete data concerning CHEMICAL COMPOSITION . . . HEAT TREATMENT . . . WELDABILITY . . . PHYSICAL PROPERTIES . . . will be mailed to you promptly. Write today.

Jones & Laughlin Steel Corporation
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☐ Please mail complete data concerning Jalloy.
☐ Please have your representative call.

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{PLEASE GIVE THIS ADVERTISEMENT TO YOUR BLASTING FOREMAN.}

Give Yourself the Best Break...

Start with the Right Primacord

PRIMACORD® is the registered trade mark brand name of all detonating fuse manufactured by The Ensign-Bickford Company. Controlled laboratory and field testing year after year has resulted in the development of many types of Primacord. For commercial blasting, the four types listed in the table below are recommended for use under the conditions shown:

CONDITIONS	PRIMACORD RECOMMENDED			
	Plain	*Reinforced*	*Wire Countered*	*Plastic Reinforced*
Jackhammer holes	X			
Shallow well-drill holes	X			
Secondary blasting	X			
Deep, ragged holes		X	X	X
Extra deep holes			X	X
Deep, wet holes				X
When a field shot must stand a long time				X
River Crossings				X
Loading with heavily reinforced explosives containers			X	

For your Trunk Line, Plain Primacord serves in most cases. You can use Reinforced Primacord to advantage, especially where the going is rough.

When thunder storms threaten, or where high voltage cables may release stray electrical currents, always use Primacord. It is not affected by stray currents — and a direct hit by lightning failed to detonate it.

For more information see your Explosives Supplier, or write to

THE ENSIGN-BICKFORD COMPANY, Simsbury, Connecticut

Primacord — Quarrycord — Ignitacord® — Safety Fuse — Blasting Accessories

Established 1836 P-17

PRIMACORD®

DETONATING FUSE

PROVED AND APPROVED

PLAIN PRIMACORD

Textile-covered, flexible and resilient. Suitable for surface trunk lines and shallow holes where tensile strength and resistance to abrasion and cutting are not required. Tensile strength 113 lbs. 1000-ft. spool 17 lbs.

REINFORCED PRIMACORD

Textile reinforced, tough, resilient, flexible. Recommended for surface trunk lines and deep holes where normal strength and resistance to abrasion and cutting are needed. Tensile strength 160 lbs. 1000-ft. spool 18 lbs.

WIRE COUNTERED PRIMACORD

Textile or plastic cover is armored with wire. Recommended for use in deep, ragged holes or with metal or fibre explosives containers, where strength and resistance to abrasion and cutting are essential. Tensile strength 220 lbs. 1000-ft. spool 33 lbs.

PLASTIC REINFORCED PRIMACORD

Covered with tough plastic material, not affected by high Summer heat or Winter cold. Waterproof—resistant to acids commonly encountered. Use for extremely deep holes, river crossings, field shots that must stand for long periods of time and in other wet conditions. Tensile strength 250 lbs. 1000-ft. spool 22 lbs.

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

APRIL, 1955

IVAN A. GIVEN, EDITOR

Blueprint for Action

IN CONTRAST to the losses of 1954, the radical change in the bituminous picture in the early weeks of 1955, and the recent improvement in anthracite, might understandably be mistaken for a boom. But if boom is too strong a word, then one might, with some justification, contend that what we are experiencing is at least a boomlet. The nice thing about it all, unless a lot of highly regarded experts have gone haywire, is that the basic drive in the economy favors a continuation of production at a high level in the remainder of 1955, with the trend still up in 1956 and the years beyond. And on top of everything else, coal is beginning to cash in on a lot of spadework that, at times, seemed hopeless and at best likely to meet with only indifferent success. The "Report on Energy Supplies and Resources Policy," released at the White House Feb. 26 and reproduced in full, with comments, elsewhere in this issue, is a case in point.

In short, the report brings Cabinet influence to bear on the elimination of discrimination against coal and the development of a fuels policy that will give coal a fair competitive break. Most of the steps coal has been advocating appear as recommendations in the report, including removal of government regulation of natural-gas production, prohibition of gas sales by pipe lines at less than cost plus a fair proportion of fixed charges, restriction of oil imports, though not to the same extent as coal has suggested, reductions in freight rates, encouragement of coal exports, and a more consistent and equitable government purchasing program.

Having called for the preparation of the report and having released it under White House auspices, it can be assumed that the administration will be willing to follow through. Failure to do so might be the booby trap, though this is a somewhat remote possibility. Under any circumstances, as a matter of fact, short of disowning the report and its conclusions, which hardly seems possible, it stands as a guide for the industry and for Congress. It already has put life into drives for legislation aimed at removing handicaps to the free development of productive capacity for defense as well as for peacetime national growth. Appropriate action by governmental departments and agencies also can be expected to follow. Intensified coal support can help convert the blueprint into a reality.

Thus, with production up and with this new blueprint for action, coal can look forward to the elimination of some of its most bothersome handicaps, clearing the way to greater progress through lower cost, higher quality and better service.

Real Dividends

APPALACHIAN COALS, INC., sat for its portrait March 4. The result was a picture of success through better service to its producer-owners in the southern high-volatile, or District 8, field; to the users of coal produced by its members; and to the general public. ACI was the pioneer regional marketing agency, organized in accordance with the findings of a coal-industry group set up to study ways the industry might profitably go to stabilize its operations. It was the only one of many regional agencies organized or proposed to survive NRA and the depression—a tribute to the soundness of its organization and the benefits it has yielded to producer, consumer and public through orderly, efficient marketing and service.

The ACI story is told in more detail beginning on the following page of this issue. The results? In a little over 21 years, ACI has sold over 600 million tons of coal in the United States and abroad. Those associated with it since its inception estimate that it got $150 million more for that tonnage than otherwise would have been possible. In this alone, ACI has demonstrated that efficient merchandising, made possible by massed power, can return real dividends.

Mass Power For Better Marketing

21 Years of ACI Experience

"In the Public Interest"

"Coal from the Appalachian region is sold in 31 states and many foreign countries. The regional marketing agency fills a vital need for an organization which can actively promote the interests of all producers—large and small—from a given area. Through the many services of a coal-marketing agency, including engineering, advertising and sales promotion, a better average realization results to all producers. In this industry, where the return on investment is historically low, this kind of enterprise is in the public interest, as well as that of the coal producers, their employees and all industry."—**Program foreword, ACI Open House, March 4, 1955.**

Payoff for Coal

"The decision came down the 13th of March, 1933, and ACI started in business a little over 30 days later. Since then it has sold for its producers in excess of 600 million tons. The best estimates of we who have worked with it over the years is that we have sold that much coal for at least $150 million more—and maybe more than that—than we otherwise would have attained . . . It is in the public interest that coal be healthy, that coal be profitable, that coal be strong, and one of the best ways to keep it strong is to keep ACI strong and have other marketing agencies that are equally strong."—**James D. Francis, president, The Powellton Coal Co.**

"On the average, our realization runs about 25c a ton higher than our close non-ACI neighbors, and it costs us 1c a ton to sell through ACI. Our domestic sales have grown in spite of an over-all decline in the market. So the higher realization hasn't hurt. We ran 251 days in 1951, while the average for the field was 190"—**David L. Francis, president, Princess Elkhorn Coal Co.**

"We derive a great many benefits from acting as a sub-agent for ACI, two of which I would like to stress:

"1. We get very real value from the opportunity of access to the many times more live market data than we could develop ourselves. This is particularly important in view of the material available to the sellers of competitive fuels.

"2. The prime function of ACI is to sell the producer's volume at the best price available. Achieving this does not, as many people seem to believe, restrict production. To emphasize this point of no reduction in tonnage or market opportunity, our proportion of the national tonnage was 1.06% in 1947. In 1955, it was 1.47%."—**C. R. Mabley, vice president, Island Creek Coal Sales Co.**

Payoff for the User

"Direct aid to the consumer in fuel problems is an important basic function of the engineering staff. This falls into five extremely wide categories:

"1. Matching coal to the equipment or improving operation to get the most out of the coal with the existing equipment.

"2. Improving the equipment, controls, metering, etc., to better results.

"3. Selecting a coal best suited to the equipment.

"4. Recommending changes in basic equipment (like a new boiler or stoker).

"5. Recommending the type of fuel to use and designing new equipment in an old or new plant . . .

"Literally thousands of plants, affecting many million tons of coal, have received this type of service." Other engineering services rendered by ACI include engineering conferences, stoker schools, technical papers, pamphlets, syndicated news columns, cooperation with railroad fuel engineers, and an engineering approach to the problem of air pollution—**Carroll F. Hardy, chief engineer, ACI.**

Formally organized March 1, 1932, and receiving Supreme Court approval March 13, 1933, Appalachian Coals, Inc., since April 17, 1933, has sold 600 million tons of coal . . . On March 4, 1955, it celebrated more than 21 years of service to its members, fuel buyers and the public, and held open house in Cincinnati, its headquarters, to permit officials and members to acquaint the industry with its aims and accomplishments as a contribution to further progress in coal merchandising . . . In quote, paraphrase and condensation, the record of achievement made at the meeting is summarized in the following.

"ACI, with its production volume, handles large-tonnage accounts. This provides the orderly means for making large daily shipments by consolidating tonnages of coals, originating at different producing-company mines—often in different sub-districts. ACI direct sales of this nature have appealed to the buyer by assuring quality control, regular daily delivery, flexibility in handling shortages and overages, and less purchasing and bookkeeping expense for the buyer. Our engineering service has proven of material benefit to consumers by the proper selection of coals for specific plants and the efficient utilization of the coal after the sale is made."—**Goodwyn Holmes, sales manager, ACI.**

Aid for the Retailer

"Consumer acceptance of ACI regional marketing is attested to by 21 yr of friendly public relations. Our continuous work with state and local retail coal merchants' associations has resulted in higher ethical standards of coal merchandising and better service to the ultimate consumer. ACI advertising and dealer helps, which are offered on a volume scale, have proven a needed stimulus to coal merchants in their fight to hold markets against oil and gas competition. These helps generally would not be economic on an individual mine basis. In our public-service work on smoke abatement and air pollution, hundreds of cities have benefited from expert legal and engineering assistance."—**Goodwyn Holmes, sales manager, ACI.**

Joining ACI

"When a producer wishes to affiliate with the agency, the following steps are taken:

"1. A conference is arranged between the producer and the officials of ACI, preferably at the agency's headquarters where all records are immediately available. The producer's position in all markets is analyzed and the market history of his coals determined. Such things as his average realization, individual realization on all kinds and sizes of coal, and his current position are reviewed.

"2. ACI reports on what results may be expected through affiliation after making comparisons. The facts usually indicate that ACI can strengthen the producer's sales in all, or at least several, categories.

"3. The producer contract, in which obligations and terms affecting both the producer and the agency are completely outlined, is signed.

"4. A subagent is then selected by the producer with the approval of ACI, and the agreement is signed by all three parties: the producer, the subagent and ACI. (The subagent is briefed on the operations of the agency and the methods used in supervising the sale of the producer's coal, and the subagent is supplied complete marketing information.)

"5. The producer's mines are visited by ACI sales managers and engineers, and they familiarize themselves with the complete operations at the mines, including mining methods and preparation.

"6. The coal-sampling truck is sent by ACI to the producer's mines and samples of the various coal sizes are taken and analyzed.

"7. The ACI marketing committee studies these analyses and the market history of the producer's coals, and then properly correlates the various kinds and sizes of coal, fitting them into proper price categories in relation to similar coals in the agency.

"8. ACI supervises the sale of the coals, furnishes price lists to the subagent and from then on works very closely with the subagent, maintaining a two-way contact by telephone, and handling situations as they arise day by day and even hour by hour.

"9. ACI keeps the producer fully advised, particularly as to realization being obtained."—**J. E. Tobey, president, ACI.**

21 Years of ACI Experience . . .

ACI Ownership

"As its name indicates, ACI is a corporation. It is incorporated under the laws of the State of Delaware. No individual owns any stock in the agency. The voting stock is owned by the producers whose coal it sells, and in proportion to their annual tonnage. ACI is managed by a board of directors elected by the stockholders."—**R. E. Howe, secretary-treasurer, ACI.**

What Producers Agree To

"When a producing company decides to employ ACI as its selling agent, it signs a contract with the agency which provides that the producer appoint it as its exclusive selling agent for the coal produced at its mines in a designated area for an agreed payment to the agency. The producer, unless prevented by strikes, fires, etc., agrees to fill promptly all orders taken by the agency and to prepare the coal in accordance with good practice; to screen such coal as directed by the selling agent; and to ship the coal in equipment indicated by the selling agent."—**R. E. Howe, secretary-treasurer, ACI.**

What ACI Agrees To Do

"The selling agent agrees to sell the coal of the producer and it further agrees to use its best efforts to sell all the coal of the producer at the best prices obtainable in all available markets, or so much of the coal as the market will justify. The selling agent further agrees that it will sell the coal of the producer in the same markets and to the same customers, and under the same mine or trade name as before; that it will maintain the trade names and good will of the producer; and that it will endeavor to broaden the market for such coals."—**R. E. Howe, secretary-treasurer, ACI.**

The Subagent's Duties

"The producer has the right to designate any person, firm or corporation to act as agent of the selling agent in selling the coal of the producer. This designation of the subagent is subject to the approval of ACI, and a three-way contract is made by the selling agent, subagent and the producer, at a designated commission to the subagent. In this contract, the subagent agrees to sell such coal as it is authorized to sell in such amounts and in accordance with such classifications as the selling agent may designate, and upon such terms and conditions as are outlined by the agency from time to time. The sub agent agrees not to depart from such instructions without the prior authorization of the selling agent. . . . All contracts are cancellable by either party by giving 60 days' written notice."—**R. E. Howe, secretary-treasurer, ACI.**

Facts for Better Marketing

"The successful operation of the marketing agency, calling for hourly decisions concerning many coals and numerous markets, demands a great quantity of precise, easily available market information and up-to-the-minute data. These fundamental market facts undergird the entire operation of a marketing agency. This market information begins with the thousands of orders and invoices relating to the production and sale of all coal by affiliated ACI companies. . . . Some 75,000 orders and contracts and around 300,000 invoices a year originate from the distribution of coal by ACI producers. These data come together at ACI where it is accumulated, coded, sorted, and classified by market area, use and account at ACI headquarters. This information then is made available to our marketing staff and our affiliated sellers in many forms, including size group and realization data.

"We maintain detailed records on some 15,000 accounts in all categories of coal's customers. In the process, this is translated into information used to guide current marketing decisions and to establish the competitive levels prevailing in various markets. This in turn means better realization at the mines through intelligent marketing of coal to the points of better demand, and through the building of customer preference for the better coals of the established and progressive producers, dedicated to better service and improved product. . . .

"Any seller or producer—including ACI producers of course—must meet the competition at any one point if he wishes to share in the business. Frequently, however, on the basis of live data from recent sales and shipments, ACI sellers are able to select better marketing opportunities and thus achieve a higher realization. The availability of current data also tends to eliminate another costly and uneconomic practice of long-range damage to both buyer and seller, as well as the general public. I refer to the haphazard distribution and sale of coal through 'panic' selling, which is of lasting benefit to no one."—**V. M. Johnstown, controller, ACI.**

Product Evaluation

"There was no charted course to follow when the original ACI marketing committee started 21 yr ago to put into effect the regional coal-marketing contracts which had been signed with producers. Literally months were spent in seam examinations, correlating and evaluating all coals and sizes produced by over 200 southern high-volatile mines. The results of the work of that committee later became the basis for high-volatile coal classification and evaluation in the Blue Eagle days of NRA and later during the Bituminous Coal Acts. So competently was this work done that it stands today, largely unchanged, as a basic standard for present ACI regional marketing functions.

"The same procedure of market evaluation takes place today when a new mine is opened or a mine affiliates with ACI. Our engineers and marketing committee make physical examination of the coal and laboratory determinations to establish values. Quality control and standards are established. Fortified with this information, equitable selling prices for the various markets and uses are given the producer and subagent by the marketing committee. These prices are related to other District No. 8 coal, thereby assuring the producer an equitable return,

his subagent a competitive selling price, and the consumer a fair buying price properly related to competitive coal values.

"ACI constantly studies the markets to make sure that all mines are provided a competitive opportunity to move their coal in the best markets—whether they be Lake, all-rail, tidewater, export or river movement. Studies are made by the staff and recommendations are sent to the producer covering use values, such as, domestic (hand-fired or stoker), by-product or general industrial application. Producers are kept advised of new coal uses and special purposes, such as, chemical by-products, tobacco curing, heat drying of farm crops and brooder heating."—**Goodwyn Holmes, sales manager, ACI.**

Evolving Sales Policies

"With the aid of advisory committees, composed of the best-qualified sales executives of our industry, each phase of coal marketing is periodically reviewed and recommendations made to the ACI marketing committee. Advisory committee meetings are usually followed by a general sales-executive meeting—an informal open-forum type of meeting—designed to lay the groundwork for the best-possible coal-marketing job. Current market data are presented to this group by the ACI staff, including market and use realization and distribution reports covering all shipments by states, counties and cities.

"Reports are received from sales executives as to inventory positions and competitive situations in the marketplace, whether they arise out of oil, gas, coal from other districts, or competitive coal from District 8. Forecasts are presented by ACI and published for the guidance of producer and consumer. From such meetings evolve the best factual information obtainable on current coal markets. The ACI staff then disseminates this information to the producer, the subagent and the consumer.

"Price schedules are issued periodically whenever necessary to properly reflect market or wage-scale changes. They are competitive and are designed to keep our high-quality coals moving to selected markets at fair and equitable prices to the producer and consumer."—**Goodwyn Holmes, sales manager, ACI.**

Backing up the Salesman

"How does the marketing agency ally itself with the salesman and his progress and accomplishments? By constant study and analysis of coal-market conditions and by an accumulation of statistical data, all of which is delineated into current trends and market potentials, it is possible to determine comparative effectiveness for all selling companies in any given territorial or geographical area. Naturally, this information—always available and regularly transmitted to all sales executives—is of great benefit to the salesman as well. It outlines quite definitely any irregularities in his pattern of sales planning or distribution program, and it fortifies him with a collection of market facts obtainable from no other source in the coal industry—and of invaluable assistance in diagnosing his progress. If he chooses, the salesman, through the marketing agency, can equip himself fully with pertinent and detailed information before making his approach, not after. This assistance is as close to all affiliated salesmen as the telephone. . . .

"Contrary to some thinking, the precepts of the marketing agency are in no way restrictive competitively to either the producing company, the selling company or the sales representative. Quite the opposite, since the marketing agency is the strongest advocate of fair competitive practices. . . . The marketing agency, through all of its research and its broad understanding of determined values, together with the combined experience of its sales executives and selling agents, is capable of concluding what fair competitive practices are possible of being effected. This is of great assistance to the salesman. . . .

"The greatest deterrent to constructive marketing, in our opinion, is the desperation price method of selling under stress. . . . It destroys markets stabilized by years of constructive, progressive and rational development, and fosters a deterioration of your company, your product and your industry neither invited nor welcomed by the great majority of sensible and intelligent purchasers. Here again the marketing agency is constantly aware of existing conditions in all markets and consciously acquainted with the true circumstances through its market surveys and actual contact with field representatives. With actual information at hand, it is at all times prepared to separate rumor from fact—and many reported ills are rumors—and thus clear the way to realistic thinking on the subject and function in its capacity as market adviser."—**G. R. Curtin, manager, industrial sales, ACI.**

"Charter of Freedom"

"When all these statements of the court [in the ACI decision] are understood in the light of the facts of the case, they reflect the application of what Chief Justice Hughes called 'the essential standard of reasonableness,' and in conclusion I want to assure you here that the decision of 22 yr ago still is the law of the land, and that in my opinion it would be reaffirmed should it be directly questioned. It stands as a decision that should serve, to use the phrase of Chief Justice Hughes, as an 'important charter of freedom for this important and basic industry.' Within the lines marked out by that decision producers in this industry may properly organize regional marketing agencies. The wide area of permissible action presents a legal blueprint that few industries in this country possess."—**Gen. W. J. Donovan, Donovan, Leisure, Newton & Irvine.** *General Donovan, with the late E. L. Greever, established the legal framework for the agency and made the record that resulted in Supreme Court approval.*

Service To All

"There are many factors involved in the achievement of better coal marketing through a central selling agency, such as ACI. The effect of grouping the output of a number of producers through a single marketing agency is, in itself, a stabilizing influence benefiting the producer, the purchaser and the general public. Another is the broader efforts that are possible through public relations, engineering and meetings for the purpose of exchanging information and mapping plans for protecting and exploiting markets."—**V. M. Johnstown, controller, ACI.**

"It has been proved beyond a shadow of doubt that the agency can maintain orderly marketing procedures even under the most chaotic market conditions created by oversupply. In its span of life, ACI has marketed about 600 million tons of coal over a vast market area embracing 31 states in the United States and all the free countries of the world which buy American coals. Through more orderly marketing it has brought better-than-average realization results to all its producers. It has sold its coals competitively, maintained better-than-average running time at its producers' mines, and at the same time has rendered a distinctive service to consumers and the public."—**J. E. Tobey, president, ACI.**

1-2 ORIGINAL CHANNEL INSTALLATION, Powhatan Mine No. 3, March, 1950.

Better Bolting at Lower Cost

A report on how Powhatan, through research and experiment, applied bolting to support very bad roof and then improved it for better results at lower cost, plus a significant increase in tons per man.

By EMMETT T. LANG
Manager of Industrial Engineering,
The North American Coal Co.,
Powhatan Point, Ohio

INCREASED PRODUCTION, a lower operating cost and a greatly improved safety record are the results of an expanding roof-bolting program at the eastern Ohio mines of the Powhatan Mining Co. Production has increased on roof-bolting sections by 20 to 40 tons per shift with a direct reduction in operating cost of approximately 20c per ton. At the same time, in the last year of operation, no lost-time accidents from roof falls have occurred in bolted areas. All these add up to the fact that roof-bolting is an integral part of coal mining now and in the future at operations of the Powhatan Mining Co.

The results reflect the untiring efforts of the top-management team, which has not been afraid to experiment with bolting until a satisfactory method was devised. Powhatan Mining Co. is headed by Henry Schmidt, president. Other members of the top-management team more directly connected with the roof-bolting program are: Roy W. Fox, vice-president; Michael Yonko, general manager; Michael Rydosz, mechanization engineer; the author; David Elerick and Michael Ondayko, superintendents, Mine No. 2; Charles Heidlebach, safety director; Phil Andes and Frank Hanasky, assistant safety directors; Pat Winters, superintendent, Mine No. 1; and Henry Kirby, superintendent, Mine No. 3. Richard McGee, deputy state mine inspector, and W. G. Cooper, roof-control investigator, U. S. Bureau of Mines, aided greatly in the development of the present standards of roof-bolting at Powhatan properties.

THE TRIAL INSTALLATION

Until the time of the original installation, at Powhatan Mine No. 2, roof-bolting had been tried in two eastern Ohio mines in the Pittsburgh No. 8 seam with little success. It was the general opinion that roof-bolting would not work in this area,

5 AFTER BOLTING in motor roads, three bolts per set, dividing area into thirds for even bolt loading.

3 **STEP PLAN** of bolting for entry support. Note uneven roof, cracks and slips.

4 **BEFORE BOLTING**—motor-road timbering plan in Mine No. 3.

but Powhatan officials were not convinced.

After much discussion of the relative merits of roof-bolting, a trial installation was authorized at Powhatan Mine No. 2 by Mr. Fox, then general superintendent. Mr. Rydosz and the author were directed to closely observe and report on the installation.

The area picked for the trial installation was in the Main West entries where all previous attempts to hold the roof with regular timbering had failed. Messrs. Elerick, Fox, Ondayko, Rydosz and the author concurred in the thought that if roof-bolts could control the roof in this area, then very little selling would be needed to convince the miners that roof-bolts would effectively support the top in other areas of the mine.

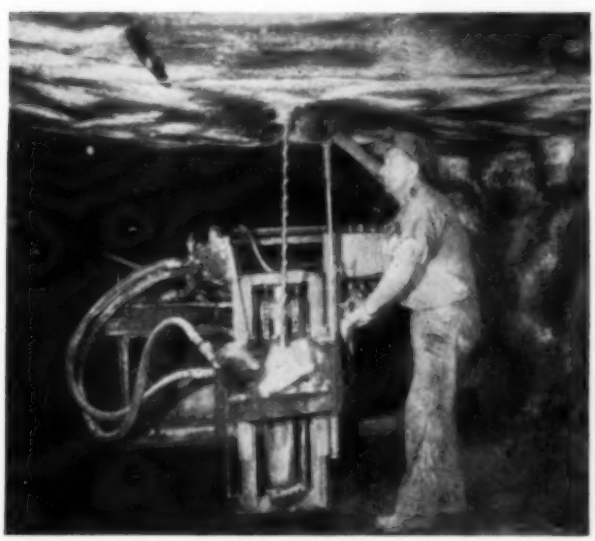
The trial installation was made beginning in April and ending May 12, 1950. During this period, 71 channels were installed and were supported by 1-in-diameter 6-ft split-and-wedge-type bolts. Drilling was done with a Cleveland stoper and the bolts were tightened with an air-impact wrench. Messrs. Cooper and McGee supervised the trial installation. Paul Kennedy, of Schroeder Bros., instructed the men in the use of the stoper and impact wrench.

Throughout the installation in the trial area, great difficulty was experienced in setting the channels because of the height of the seam, an inadequate compressor and the unfamiliarity of the men with the equipment. An attempt was made to conduct the roof-bolting experiment without interfering with the production cycle of the face crew, but difficulties previously listed made this impossible. The experimental area was confined to two entries. After the experiment started 16 channels were installed in two shifts before the air compressor blew up.

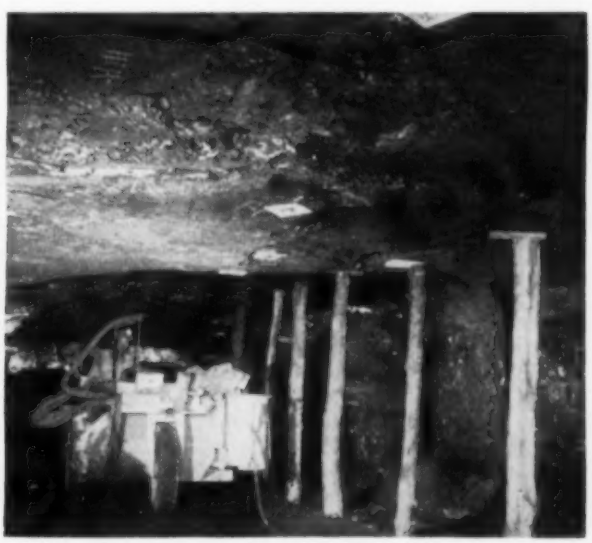
A length of entry was left unchannelled. Roof-bolting was started again in the loading zone, but after a few channels were placed, the compressor failed again. After a new compressor was borrowed, 48 channels were installed as rapidly as production permitted. The bolted area was dangered off and allowed to stand to determine roof action in the channelled area. The results were gratifying. The roof fell to the limestone all around the bolted areas and up to the first channel but the bolted area held securely.

COST V. BENEFITS

All the miners in Powhatan Mine No. 2 were convinced that roof-bolting was the answer to the question of



6 **SLIDING-HEAD BOLTING UNIT** at work in entry using step plan of roof support.



7 **BOLTING MACHINE** leaving 15-ft room—bolts on 6-ft centers, row of posts along rib.

8 CRAWLER-MOUNTED BOLTING UNIT setting bolts in future motor road.

9 STOPER-TYPE BOLTER following step plan in entry work in a Powhatan operation.

10 BOLT RECOVERY—Two-man crew and equipment in action.

supporting the roof in previously unminable areas. Management needed more convincing. The channels held the top, but at what cost?

At the time of the installation, the Main West entries were being driven 10 ft wide. With an average seam thickness in this area of 66 in, a cut yielded approximately 17.5 tons. Two channels were set per cut. The roof-bolting material cost was $16 per cut, and the labor cost to install the channels was $10. Thus, total cost was $26 for a yield of 17.5 tons, or $1.485 per ton for roof-bolting.

The test area clearly indicated that roof-bolting in the Pittsburgh No. 8 seam in Eastern Ohio was possible using channels. It remained to be proven if the top could be supported using bolts and plates, and also that roofbolting could be done economically.

During the ensuing 18 mo, many conferences were held by Messrs. Fox, Rydosz and the author to consider various roof-bolting machines and methods of bolting. Finally an order was placed with J. H. Fletcher & Co. for a late-type Baker-Fletcher machine. It was selected because of ease of maneuverability, speed of drilling, and the fact that the controls were located so that one man could operate the drill if the occasion arose.

The order was placed in November, 1951, and the machine was delivered in January, 1952. With the new bolting plan, a new test installation was necessary to get the state and federal permits required before bolting could supplant the standard method of timbering then being used in the mine.

SECOND BOLTING PLAN

The second trial installation was made in March, 1952. Again the West Main entries were chosen for the experiment, since the roof conditions in this area were very poor. The roof coal varied from zero to 4 in at the most. The conglomerate above the roof coal tended to cave readily.

The roof was being controlled with 5x7-in sawed bars 12 ft long. They showed signs of overloading shortly after being set. Falls were frequent and covered large areas. After two idle days, it was not uncommon to have large falls in every working section in the mine, resulting in many overtime shifts on Sunday to insure full production time on Monday mornings.

The No. 7 Mains West entry was chosen as a test area, using a 60-in-long ¾-in-diameter Bethlehem bolt, split Westinghouse expansion shell with PALNUT and 6x6x¼-in steel bearing plate. The drilling was done with the new Baker-Fletcher hydraulic unit, which also tightened the bolts. Using Kennametal roof bits, the first 3 ft was drilled with a 1¾-in starting bit. Then the hole was completed to a 5-ft depth with a 1⅜-in. bit.

The pattern decided upon for the best control was one which concentrated holding strength in the center of the entry. Average entry width was 10 ft. Eight bolts were set per cut with the bolts arranged in two lines.

POWHATAN MANAGEMENT TEAM includes George Yonko, foreman, No. 3 mine; Henry Kirby, superintendent; and Michael Yonko, general manager.

EMMETT T. LANG, author of this report on bolting at Powhatan.

The center bolts were spaced 15 in on each side of the center line, and the outside bolts were 20 in from the two center bolts. All bolts were tightened to approximately 200 ft-lb of torque, and two timbers were set per cut in the test area. A daily check showed little or no loss in torque.

The drilling was moderately hard for most of the hole and very hard for the last 8 in, drilled in a streak of limestone. At the time of the installation, officials were still thinking in terms of anchoring to something solid to support the roof rather than the beaming effect, which was to come later. Fig. 1 shows the entry pattern as well as how the chutes were bolted.

THIRD EXPERIMENT

A third test area, using 54-in bolts, was established in the No. 1 Entry of the B North face entries.

These bolts showed a rapid loss of torque from the original of 200 ft-lb to 100 ft-lb in the first 2 wk. This entry was abandoned and the timbers removed. The roof showed no signs of subsidence, and the torque, instead of dropping further, showed a tendency to increase. All the timbers were removed in about 200 lin ft of bolted entry, and it was dangered off and closely checked by torque test, sounding and visual observation. No subsidence was noted.

A pull test was conducted in this area by a Bureau of Mines representative, with the district deputy mine inspector, mine safety committee and company officials witnessing the pull. The test was very encouraging and conclusive. The bolts held with pressures up to 12,000 lb. They pulled down about 1 in, but returned to place when the pressure was released. Further pressure was applied and moderate slipping was noted at 17,500 lb. Pressure had to be increased to 23,000 lb before the bolt was pulled from the hole. It was then decided by the company officials that

Table I—How Cost of Material Compares in Timbering and Bolting, Powhatan Mines

Entry 10 ft wide: seam thickness, 5½ ft; cut depth, 8 ft; yield, 17½ tons

	Timbering				Roof-Bolting			
	No.	Unit Cost	Total Cost	Cost per Ton	No.	Unit Cost	Total Cost	Cost per Tons
5×7-in×10½-ft bars	2	1.84	3.68	.....	..	.....	.....	.....
7-ft hardwood posts	4	0.23	0.92	.....	..	.....	.....	.....
Wedges	12	0.02	0.24	.....	..	.....	.....	.....
¾-in×5-ft bolts	..	.....	.....	.....	3	0.52	1.560	.....
6×6×¼-in plates	..	.....	.....	.....	3	0.17	0.510	.....
Palnuts	..	.....	.....	.....	3	0.01	0.030	.....
Expansion shells	..	.....	.....	.....	3	0.215	0.645	.....
Total material	..	.....	4.84	0.277	..	.....	2.745	0.157

Table II—How Labor and Material Cost for Loading Compares in Timbering and Roof-Bolting

Conditions same as in Table I

	Daily Rate	Cost per Ton: Timbering, 170 Tons per Day	Cost per Ton: Bolting, 190 Tons per Day
1 Joy operator	20.68	0.122	0.109
1 Joy helper	19.46	0.114	0.102
2 Cutters	41.36	0.243	0.218
1 Driller	19.46	0.114	0.102
1 Shotfirer	19.46	0.114	0.102
1 Shuttle-car operator	18.44	0.108	0.097
1 Loading-head operator	18.25	0.107	0.096
2 Timbermen	36.50	0.215	.....
1 Roof-bolter	18.25	.....	0.096
Total labor cost	.....	1.137	0.922
Total cost, material and labor	.....	1.414	1.079
Roof-bolting savings, per ton	.....	.....	0.335

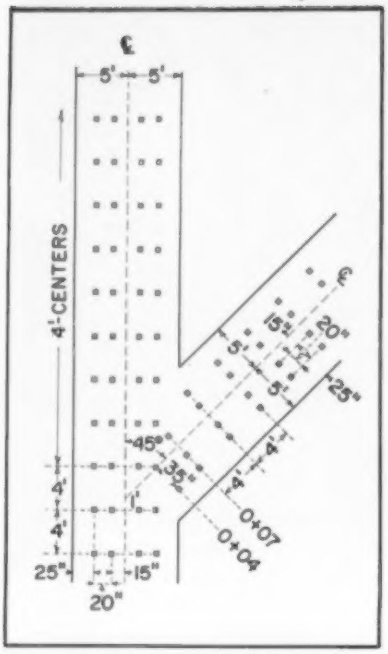


FIG. 1—**SECOND BOLTING EXPERIMENT** concentrated holding in center.

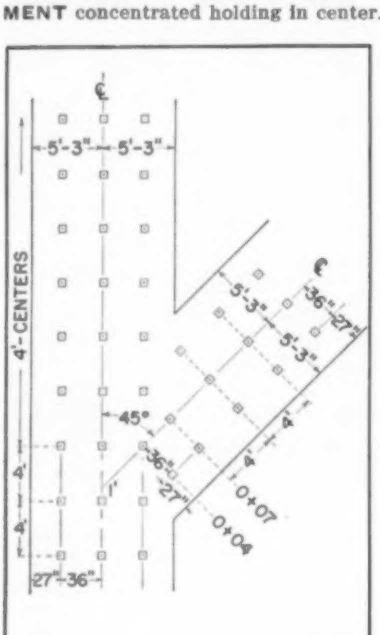


FIG. 2—**MOTOR-ROAD PATTERN**, area in thirds for equal loading.

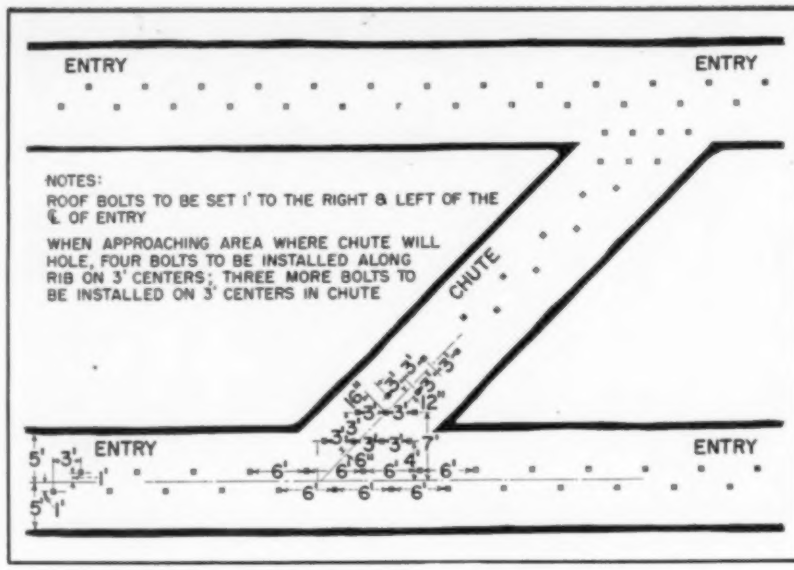


FIG. 3—**STEP PLAN** for bolting entries in Powhatan mines.

timbering could be discontinued in favor of roof-bolting all entries and chutes according to the plan in Fig. 1.

EXPANSION AT NO. 2

When the D South face entries were turned in Mine No. 2, very hard drilling was encountered about 3½ to 4 ft in the roof. It was almost impossible to drill through and many bits were ruined. An experiment with 48- and 54-in-long ¾-in bolts with Westinghouse shells was tried—50 of each length being set in this hard rock.

The pattern shown in Fig. 1 was followed. All bolts were set to about 200 ft-lb of torque. On the following day the 48-in bolts showed a loss of torque with a slight roof subsidence. Subsequent tests showed no further loss of torque or subsidence. The 54-in bolts showed no loss of torque and no subsidence.

Conditions of a different nature were found in the No. 7 and No. 8 Mains West entries. No hard drilling was encountered for the full depth of the hole. The roof coal was found to be fairly thick, averaging 15 in, and firm. It was decided to try three bolts per set, six per cut, splitting the entry into thirds, and thus distributing the load per bolt equally. This test was discontinued because the roof coal ran out and a clay vein was encountered. Approximately 120 lin ft of entry was bolted with this pattern. The area showed no signs of subsidence and the bolts held their original torque. This test area was used to secure the permit which is now used for bolting all motor roads in all of the Powhatan mines. The pattern is shown in Fig. 2 and Photo 5.

Depressed market conditions resulted in slowing down further expenditures for roof-bolting equipment. After thorough study of the Baker-Fletcher drill and another type of roof-bolting machine at nearby mines, two additional Baker-Fletcher drills were ordered for Mine No. 2. In September, 1953, when this mine was closed because of loss of market, bolting units were moved to Mine No. 1.

ROOF BOLTING AT NO. 1

When roof-bolting began at Powhatan Mine No. 1, the program started in high gear. Test areas had already been established for six bolts per cut, as shown in Fig. 2, and this pattern was followed for all development work. A 2x10x18-in wood cap piece was used in addition to the 6x6x⅜-in steel plate on the motor road entries.

When Michael Yonko became superintendent of Mine No. 1, Charles Heidelbach, safety director, was put in charge of the roof-bolting program. Additional test areas were quickly established, using the "step plan" for bolting entries (Fig. 3) with and without the wooden cap piece, with a 6x6x⅜-in shinplaster, with a 6x6x¼-in shinplaster, and with a ¾-in bolt in lengths of 5, 6 and 7 ft. After the test areas had stood for sufficient time, permits were received permitting the use of any of the above combinations.

BOLTING AND COSTS TODAY

All development work, except motor-road entries, is bolted according to the step plan. The unit is a ¾-in-diameter by 5- or 6-ft Pattin bolt with a PALNUT, Ohio Brass expander and a 6x6x¼-in steel plate. A 2x10x18-in wood cap piece is used where needed. All motor roads are bolted with six bolts per cut as shown in Fig. 2.

In rooms 20 ft wide at Powhatan Mine No. 1, a permit has been secured which permits one bolt line to be set in the center of the tram road, with bolts on 6-ft centers and a row of posts 5 ft from either rib line. At Mine No. 3, in rooms 15 ft wide,

bolts are set on 6-ft centers, 5½ ft from the left rib with a post line 5 ft from the right rib.

Establishment of these standards aided materially in reducing roof-bolting costs, but the biggest cut was achieved when it was determined that one man could set the number of bolts required by the new standards in a shift. Consequently the cost comparison between roof-bolting and conventional timbering worked out so favorably for bolting that no difficulty was experienced in securing additional equipment. In the very near future, sufficient roof-bolting machines will be available to equip all units in Mine No. 1 and all development units in Mine No. 3. Tables I and II show typical comparisons in support cost, and in labor cost for coal loading, in entry work.

In room work, an even greater saving in material cost per ton was made when a standard of one bolt on 6-ft centers with a double row of posts was substituted for the two timbers per cut which was the standard method of roof-support before the mine was converted to roof-bolting.

Using one bolt on 6-ft centers means that 1⅔ complete assemblies and 3⅓ posts are used per cut instead of 2 timbers and 4 posts in the conventional system. This resulted in a supply cost saving of $2.93 for every wide cut recovered, or a material cost of $0.069 per ton, compared to $0.155 previously. In other words the cost of the present support in room work is now one-half the former cost with conventional timbering. In addition, production from wide-work crews increased 30 to 40 tons per unit shift.

The following, incidentally, compares the cost of roof-bolting an entry under the step plan with the cost of the original channel installation—with a clear gain for the step plan.

	Cost per Cut	Cost per Ton
Original channel method	26.00	1.485*
Present step plan	4.43	0.260*

* Bolting labor and supplies only.

Production per face-shift at Powhatan Mine No. 1 for three different dates is shown in the following table:

	Tons per Face-Shift
January, 1953	16.53
November, 1953	18.10
November, 1954	20.27

The gain in production from January, 1953, to November, 1953, resulted from replacing 3-ton wood mine cars with 13-ton steel cars, while the gain in production from November, 1953, to November, 1954, resulted directly from the roof-bolting program.

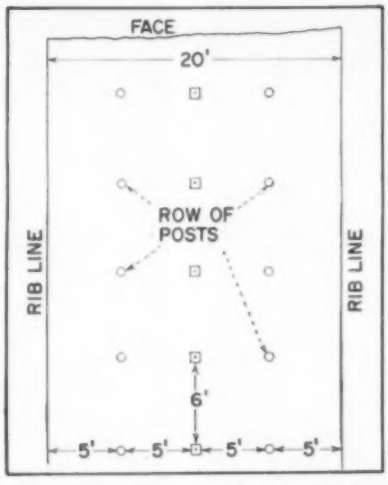


FIG. 4—ROOF-BOLTING STANDARD, 20-ft rooms, Powhatan Mine No. 1.

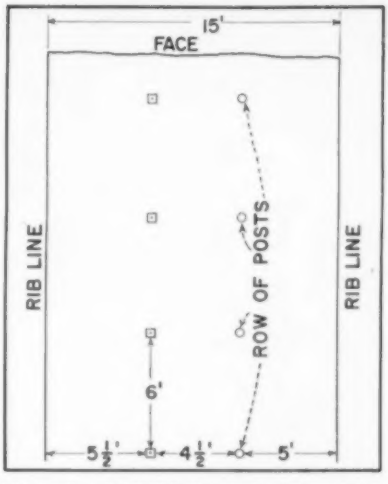


FIG. 5—TIMBERING PLAN, 15-ft rooms, bolts on 6-ft centers, No. 3.

The over-all cost of production for the Powhatan mines has decreased as the number of roof-bolting units has increased. A considerable saving was made in the labor cost of supply handling in addition to the saving in face labor cost.

ROOF-BOLT RECOVERY

The roof-bolt recovery program now getting into full swing will further decrease the supply cost. At present, two men recover an average of 190 complete assemblies per shift and have recovered as high as 280.

The present low average is a result of not having a sufficiently large area in one location to recover at one time. The method of recovery is shown in Photo 10. Adoption of the step plan in place of the 8- and 6-bolt pattern for entry work has greatly reduced the roof-bolt recovery cost, since no cost is involved in recovery of a bolt that has not been installed.

SAFETY ENHANCED

Since the inception of the roof-bolting program at the Powhatan mines in 1950, no lost-time accidents due to roof falls have occurred in roof-bolted areas.

Mine No. 3 recently completed an entire year without any accidents due to roof falls. The general roof characteristics of this mine can be gaged from Photo 3, which shows the great number of slips in the roof.

FUTURE BOLTING

Whether further savings can be made by changing the methods or materials used in roof-bolting at Powhatan remains to be seen, but the officials are considering several other means of cutting the cost of this operation even further.

Other possibilities for cost reduction lie in the use of a ⅝-in-diameter AISI (C 1040) steel bolt in place of the present ¾-in bolt. Reduction in the size of the shin-plaster may be possible, and an attempt will be made to have one bolter service two wide units. The number of bolts set in room work is so small that one man could easily keep the roof-bolting in step with the remainder of the production cycle. Whatever savings the future may bring will only cement more firmly the position roof-bolting now holds in the production cycle at the Powhatan properties.

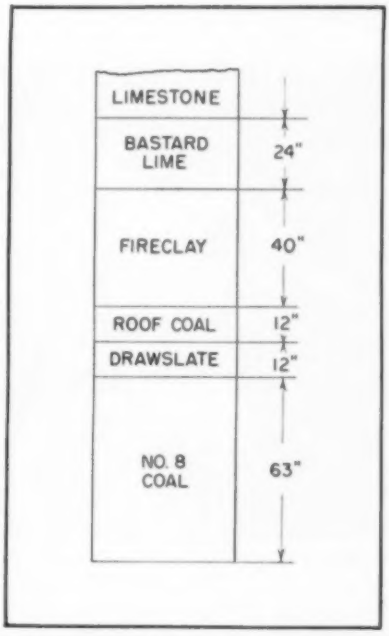
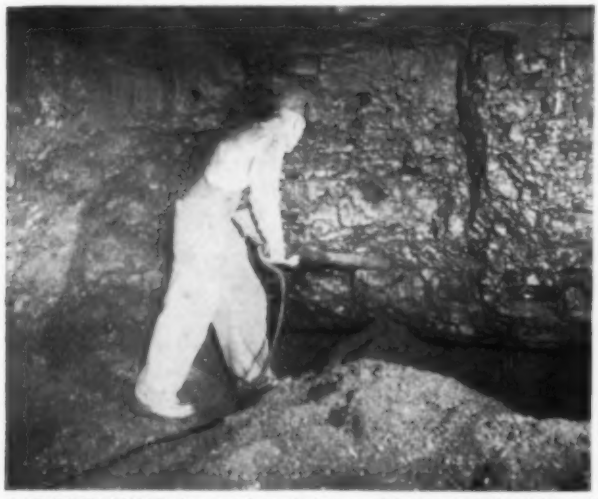


FIG. 6—TYPICAL ROOF SECTION, Powhatan mines.

CUTTING IN THE NO. 5 SEAM, which contains pyrite inclusions, is done with shortwall and throwaway bits.

TWO DRILLERS each make two setups of post-mounted units in drilling 14 holes in 14-ft-wide development openings.



AIR-BREAKING is employed for making on-shift falls of coal. About 200 holes per shift are drilled in 8 or 9 places.

COARSE COAL throughout the cut in best position for machine loading is the goal of Tri-K's face preparation.

DROP-BOTTOM MINE CARS (left) receive coal from shuttle cars over elevating conveyors, then discharge into 300-ton track hopper (right) which feeds 30-in slope belt. Minimum delays and manpower economy are main features.

Efficient Deep Mining, Custom Coal Cleaning

Well-planned face preparation and smooth haulage boost underground efficiency at operations of Tri-K Mining Co. Flexible sizing and loading units permit production of wide variety of sizes.

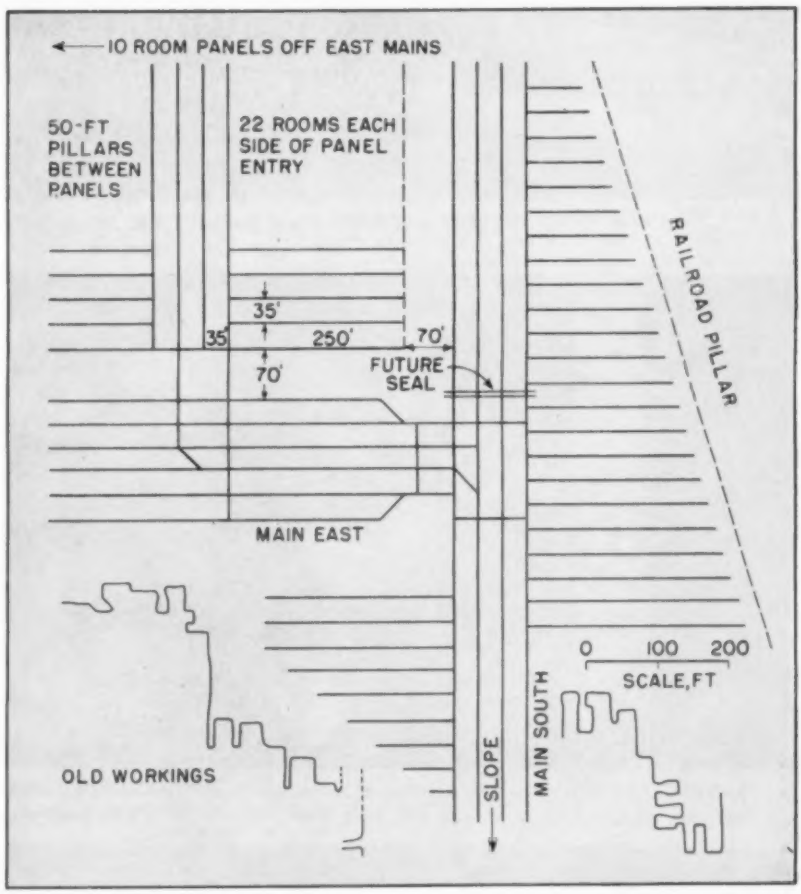
MODERNIZING a washery and tipple at the best location for shipping the product by rail or truck, then opening a new portal for the double purpose of opening up solid reserves and eliminating haulage problems in transporting coal from the old portal to the tipple are recent steps taken by Tri-K Mining Co., Terre Haute, Ind., to increase over-all efficiency.

The company's former opening into the 6-ft Indiana No. 5 seam was through a shaft some distance from the calcium - chloride coal washery, necessitating truck haulage between the two. The new portal is a belt slope from which the conveyor feeds directly into the washery. Development of the new slope was completed in 1953, leading to the abandonment of the shaft in January, 1954, and the transfer of operation to the slope a few weeks later.

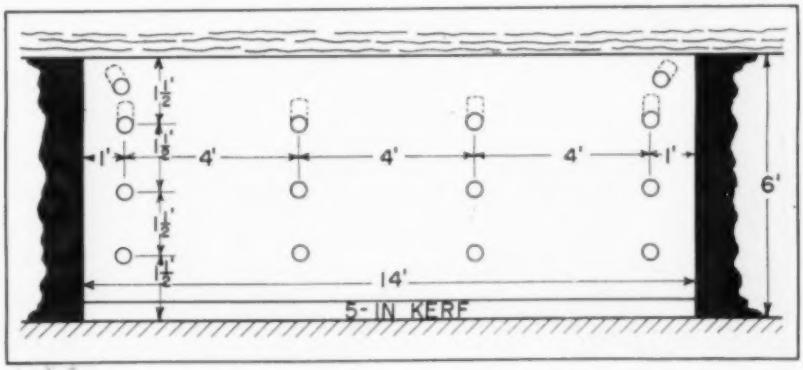
Tri-K is headed by Darrell V. Kerns, president, and his father, Harry Kerns, vice president. William Fulwiler is office manager. The Terre Haute office of Bell & Zoller Coal Co. handles rail-shipped sales of the company's product, which is known as Tri-K Superwashed Coal. Truck-hauled local sales are processed at the operating offices on the property.

UNDERGROUND LAYOUT

Projections for underground workings have been laid out to take advantage of the good roof in the area and to achieve highest-possible recovery



RAPID DEVELOPMENT in confined areas and driving rooms wherever possible mark Tri-K's early operations.



COAL-BREAKING ROUND requires 12 deep holes in face and two shallow holes in top corners.

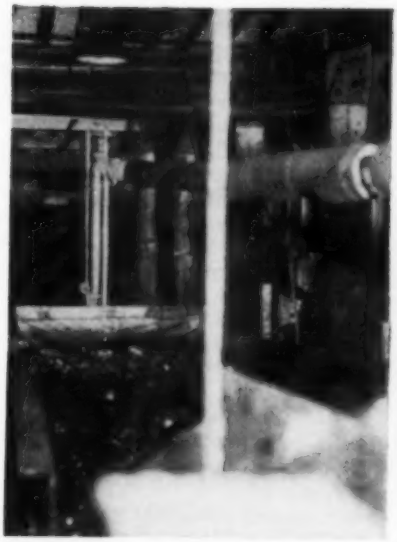
TRI-K SURFACE FACILITIES include washery and tipple, offices, shop and power station.

VIBRATING FEEDER and ring crusher remove raw coal from underground track hopper and load slope belt.

RAW-COAL SCREEN at top of preparation circuit removes ¼x0 carbon from feed for calcium-chloride washer.

CLEAN-COAL DEWATERING SCREEN discharges onto belt conveyor which elevates coal to sizing and loading plant.

DARRELL V. KERNS, president, supervises Tri-K operations.



SIZING SHAKER feeds stoker, nut, egg, lump to four tracks and truck bin.

ADJUSTABLE CRUSHER crushes 4x2 to any top size down to 1 in.

CLEAN, SIZED COAL is loaded at tipple which is equipped for oil treatment or freezeproofing of long-haul shipments.

TRUCK-LOADING YARD employs portable elevating conveyors to transfer coal from railroad cars, and a high-lift loader handles ground-stored coal.

in view of the fact that pillars will not be mined.

The four-heading main entry is driven due south from the foot of the slope through a solid pillar between worked-out areas of the seam, and are to be extended to a length of 1,000 ft along the west limits of the solid area. As shown in the diagram of mine projections, the major share of production is to be recovered from room panels worked south of the east mains. All entries, including panel entries, were projected to consist of four 14-ft headings on 35-ft centers with breakthroughs 45 ft apart. However, two additional headings were added in the east mains to increase the number of working places.

In developing the south mains, sufficient working places could be provided in certain areas by driving rooms of varying length east and west of the mains, as shown. In other areas, where the closeness of old workings eliminated such opportunities, the development work in the four headings was triple-shifted to provide reasonable daily production and to penetrate the restricted areas quickly.

The first of 10 room panels to be driven off the east mains now is in production. Each will include 22 rooms on each side of the panel entry, those on the left driven as the panel advances and those on the right on retreat. The rooms are 22 ft wide on 35-ft centers and 250 ft long.

MANPOWER AND EQUIPMENT

The employment roster lists 58 people, including officials, office personnel and surface employees.

Tri-K is equipped with two conventional mining units, one operating a single shift per day in the south mains and in the rooms west of these development openings and the other operating a double shift in the first room panel.

The unit in the south mains consists of a Joy 8-BU loading machine, two 42-E shuttle cars, a Jeffrey 35 BB cutting machine, a post-mounted Chicago Pneumatic 473 coal drill and a Joy T-2 truck.

Eight men make up the crew of this unit, including operators for the loading machine and shuttle cars, two machine men, a driller, a tamper and a ventilation man. Off-shift shooting with permissible explosives is the rule in this section, so the driller stays on as shotfirer for a half hour after the shift is over. Off-shift shooting makes it necessary to have about 16 working places in the south mains and west rooms.

In the room panel the equipment includes an 8-BU loading machine, one 42-E shuttle car, a Goodman

512 cutting machine with bugduster and tilt jacks, two post-mounted CP 473 coal drills, T-2 trucks for the cutting and drilling crews and an Armstrong compressed-air coal breaking operator.

Other underground employees include three day-shift and two night-shift maintenance men, two locomotive operators on each shift, a three-man face-preparation crew on night shift to make coal in the south mains or west rooms for day-shift loading, a day-shift attendant at the slope-belt loading station and a fireboss.

Underground operations are in charge of William Craft, mine superintendent, assisted by Tom Salmond, day foreman, and John Moretto, night foreman. D. O. Powers is chief electrician.

FACE PREPARATION

The coal is tight and sulfur inclusions in the seam and along the bottom make it necessary to follow tried and tested procedures in preparing coal for loading. The tilt jacks on the cutting machines and the mechanical-feed characteristics of post-mounted coal drills have been adopted to achieve efficient face-preparation in spite of these natural difficulties. The cutting machines are equipped with 7½-ft Prox cutterbars and Prox accessories, including chains and double-point throwaway bits, and the coal drills drive 2⅝-in augers tipped with 5/16x5/16x2½-in double-chisel, throwaway bits in drilling for air breaking.

As shown in the accompanying diagram, a coal-breaking round in a 14-ft-wide face requires 12 holes 6 ft deep and two top-corner plug-holes 1½ ft deep. The shallow holes are necessary to break down tight top coal to maintain the dimensions of the opening.

Both drillers concentrate on one face at a time, each making two set-ups of his post-mounted unit to drill half of a complete round. Normal duty for the drillers is about 200 holes per shift in the eight or nine working places in a section.

The mechanical-mining unit now developing the south mains and recovering coal from the short rooms eventually will be transferred to the room panels off the east mains, and off-shift shooting will be discontinued in favor of on-shift air-breaking.

TRANSPORTING THE COAL

Shuttle cars, car-loading elevators, bottom-dump mine cars and the slope belt provide a face-to-tipple haulage system featuring minimum delays and maximum labor economy. Six shuttle-car operators, four locomotive operators and the attendant at the slope-belt loading station are the only full time transportation employees.

Shuttle-car discharge stations in the active sections are moved up at intervals of about 400 ft to eliminate backlashing their cables. In the room panels, the discharge station will be set up opposite Rooms 5, 11 and 17, as the panel is developed, and track will be laid in the haulage heading accordingly. At the time the photos were taken, one discharge station at the intersection of the main entries served the units working both the east and south mains, with Joy P-11 elevating conveyors loading into the same trip of mine cars from both sides.

The mine cars are 5-ton Sanford-Day units, which are hauled in 8-car trips from the shuttle-car discharge station to a 300-ton bin over the foot of the slope. The slope pierces the vein and extends downward to a point 50 ft below the bottom of the vein to accommodate the bin.

Equipment at the bottom of the bin includes a Robins Vibra-Feeder and an American Pulverizer S-30 ring-type crusher, a combination designed to reduce the raw coal to minus 8 in. The Vibra-Feeder is dressed with 3 ft of lip screen to by-pass minus 4-in material around the crusher and place it directly on the slope belt. The crusher has done an effective job in reducing to minus 8 in the coarse material containing hard sulfur inclusions, Tri-K officials report. The crusher product in turn is loaded on top of the fines on the 30-in Hewitt-Robins slope belt which operates on a 3½-in-12 inclination. Cover at the slope is about 70 ft thick.

Ventilating air for the belt-loading station under the bin is conducted downward from the haulage level through a steel duct and exhausted to the surface through a 12-in borehole.

WASHING AND SIZING

Calcium-chloride washing in a Belknap unit, flexible sizing facilities and optional oil-treating or flake calcium-chloride freezeproofing are features of Tri-K's cleaning operations, which are under the supervision of Maurice Heaton, preparation manager. Washing equipment was furnished by Fuel Process Co., Charleston, W. Va., and plant layout was done by Templeton-Matthews Corp., Terre Haute. Throughput is about 100 tph, and the plant works a single shift plus enough time at the close of the shift to empty the underground bin to make room in the bin for night-shift coal. This usually requires approximately ½ hr.

The slope belt discharges onto a double-deck 5x12-ft Robins Vibrex screen which splits the feed at 2 in and ¼ in. Overproducts of the two decks are chuted directly into the washing unit and the ¼x0 carbon is transported by belt conveyor to an elevated bin over No. 1 loading track. The Vibra-Feeder at the foot of the slope may be remotely controlled from a station near the raw-coal screen to adjust its feeding rate to the capacity of the raw-coal screen.

Clean coal is discharged from the washer onto a 5x12-ft Robins Elliptex dewaterizer, then is transported on a second belt conveyor to the sizing and loading tipple.

Refuse is scalped, crushed and recirculated as follows:

The original refuse elevator of the washing unit was lengthened to permit the installation of a bar grizzly with 2-in openings and a 12x18-in Jeffrey Flex-Tooth crusher. Minus 2-in material passing through the grizzly is final refuse. The 2x8 coarse refuse is crushed to minus 2 in and returned by a short belt conveyor to the main plant-feed conveyor. Final refuse is collected in a bin under the grizzly and is used extensively for fill and road-surfacing material.

HANDLING CLEAN COAL

Clean coal from the dewatering vibrator is discharged from the clean-coal conveyor onto the final-sizing shaker in the tipple. Standard sizes produced on the shaker are 1¼x¼-in stoker, 2x1¼ in nut, 4x2 egg and 8x4 lump, each loaded on a separate track. An extension of the lump chute is carried beyond the loading tracks to a truck-loading bin and trucks also may load carbon (¼x0) at Track No. 1.

A Viking hot-oil system is installed at Track No. 2 to permit oil-treatment of stoker coal.

Tipple equipment also includes a 24x20-in Jeffrey Flex-Roll crusher to which 8x2-in coal may be directed. The crusher product is returned to the head of the sizing shaker by a Fairfield scraper conveyor.

Still another refinement, contributing to increased flexibility in producing sizes desired by customers, was the recent installation of an adjustable Gundlach DR-27 crusher to receive 4x2 egg coal from the shaker and reduce it to any top size down to 1 in. The adjustment may be made while the crusher is operating. Finally, graded screenings may be loaded with stoker, nut or egg.

Truck coal is transferred from railroad cars over three Lake Shore portable elevating conveyors, as shown in the accompanying illustration, and a Hough Payloader is used to load ground-stored coal.

The Coal Commentator

Not So Good

Foreboding at any time, "not so good" becomes especially so when it is used to describe the results of a major effort in the promotion of safety. In short, after a good start in January, the "1955 Coal Industry Campaign to Prevent Falls of Roof, Rib and Face Accidents" got a setback in February with 25 fatalities, compared to 16 in February, 1954. For the first two months, the fatalities stand at 41—the same as in 1954.

The cause? Failure to get the story across to the miner, according to the committee in charge of the campaign. Here is a real challenge for the coal-mining manager and supervisor, the meeting of which, aside from the very welcome benefits of higher efficiency and lower cost, can bring the greatest of life's satisfactions—the saving of human life and limb.

Soucopes Volantes

One thing editors get is a lot of material for reading—and they look it over carefully to make sure they don't miss an idea. One publication that comes to *Coal Age* is *France Actuelle*, which makes *Coal Age* this month because your commentator became fascinated with the French for "flying saucers," to wit: "soucopes volantes." So, we give you the item that appeared under that head in the March 1 issue:

"Throughout last summer, visionary Europeans, including the French, were spotting flying saucers. After investigating all reports from Frenchmen who said they had seen them, the French Air Ministry now concludes that 'all sincere and sufficiently precise' reports had 'natural explanations.' On the other hand, the ministry itself seems open-minded regarding the possibility of flying saucers, for its statement remarks that military aircraft have been authorized to seek out saucers, if seen, 'provided there is no risk of accident.'"

"Cheapest in the World"

For something to stop a coal man, your commentator recommends "The Cheapest Coal in the World," the head on the leadoff feature in a report entitled "The Coal Mining Industry of South Africa," issued by the Transvaal and Orange Free State Chamber of Mines. The report doesn't say how much cheaper, or why, but it does present a picture of an active industry, with 62 modernly equipped collieries turning out over 30 million tons a year.

Coal can be cheap in terms of money but expensive in terms of man-hours of low-paid labor. Or, with good wages for workers, it can be cheap in terms of man-hours per ton and in money too. This seems to be the way the South Africans look at it in view of the equipment and methods they employ. Maybe the coal men of America will want to argue about who can produce the cheapest coal, but a lot of countries in addition to the two U.S.A.'s are aiming at that same thing, and are developing some ingenious machines and methods to help them reach that goal. **Recognition of the basic importance of low-cost coal in plentiful supply is world-wide.**

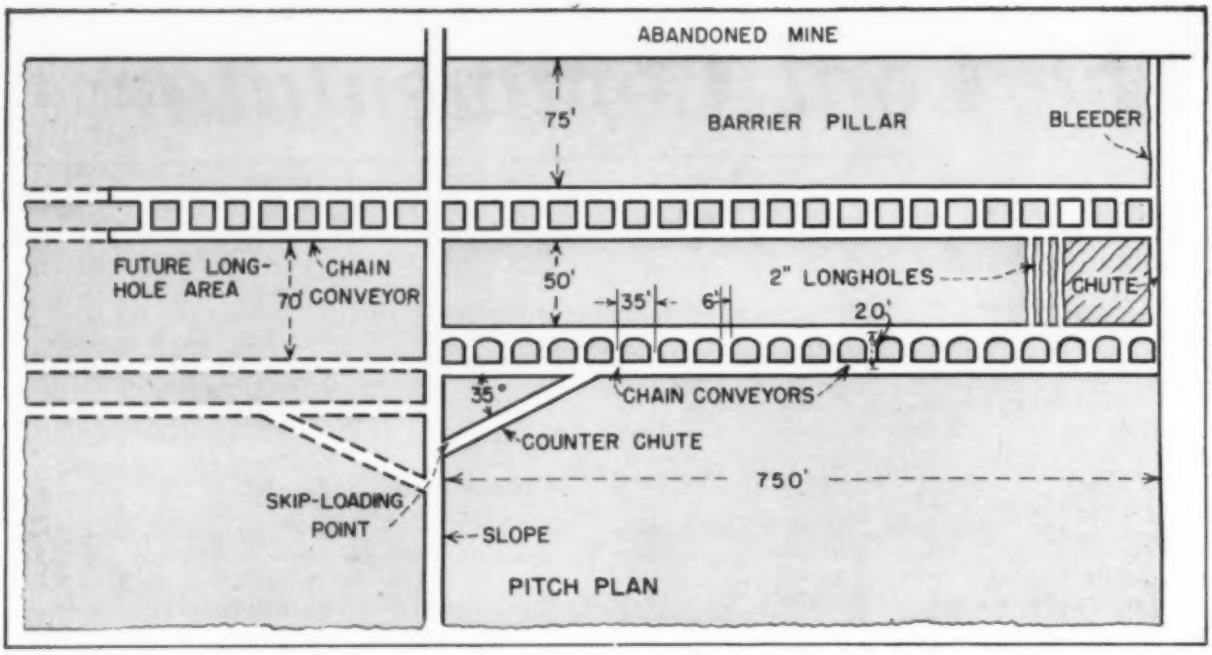
"No Major Setback"

"The functional ceiling may be heated by concealed hot-water convection in the overhead between floor beams. It may radiate a gentle heat from an interlining of electrically-conductive rubber. It may exhale a draftless breath of warm or cool air through diffusing panels. Otherwise it may exercise a three-way purpose, heating or cooling through the radiative or absorptive properties of perforated aluminum panels, snapped onto a grid of water pipes, the pipes in turn suspended beneath an insulating blanket."

This functional ceiling was only one of the new wonders in heating, cooling and air conditioning displays at the 1955 International Heating and Ventilating Exposition in Philadelphia, hailed as the largest "in the continued growth of an industry that has never known a major setback." Year-around heating and cooling of homes was emphasized, reflecting the growth in this business, with heat pumps prominently in the foreground as the suppliers of this all-year comfort. **The exposition was one more indication that summer air-cooling and conditioning is due for major growth. The additional electrical load will require real tonnages of coal to make the power. So, while coal men make themselves more comfortable, they can enjoy better business.**

Coal Buster

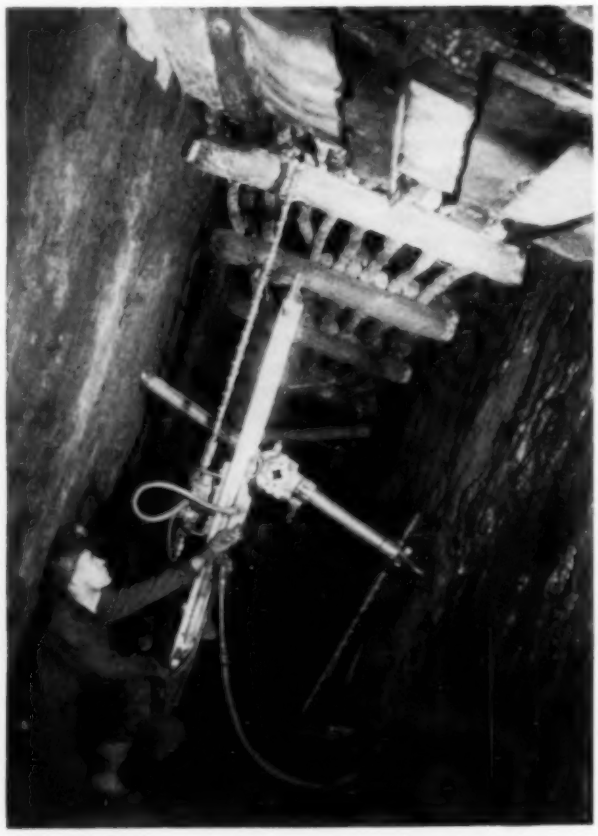
Recovery of the Btu's without going underground to mine the coal is logical step in the development of energy extraction from the earth. So far, however, the process offering the major possibility —underground gasification—is still only a possibility in the United States. One problem has been making openings to establish the combustion zone. A second is controlling the burning after combustion has been established. Now, in a new experiment at Gorgas, hydraulic pressure is used to open up cracks between boreholes and establish passages for combustion zones. In addition to being much cheaper, indications are that control of combustion—and consequently of gas quality—will be materially simplified. Could be that underground gasification on a commercial scale is not as far off as might be thought. **And maybe hydraulic fracturing will be a useful tool in draining off methane in highly gaseous seams at less cost and with greater safety than depending on ventilation air alone.**



HOW HI-TEST MINE is laid out for efficient pitch mining with longholes. Gravity and modern equipment are teamed to reduce human effort and get high output per man.

Modern Equipment, Simplified Mining in Longholing

LONGHOLE MINING is used to recover 50-ft blocks of coal between levels. Increased recovery of coal with greater safety and less human effort are top benefits.



NEW-DESIGN rotary air drill with aluminum feed shell can be operated in 6½ ft of headroom if necessary. An average 50-ft hole is drilled in 17 min.

New Anthracite Mining Practice Gets 23 TPM in Pitching Vein

Longhole mining with new-type rotary air drill at the Hi-Test Coal Co. keys high output per man, reduces timbering costs, simplifies ventilation and increases coal recovery.

GREATER SAFETY FOR WORKERS, better control of mining, increased recovery of coal, simplified ventilation and reduction of human effort are among the top benefits resulting from a new anthracite mining method used at the Hi-Test Coal Co., Good Spring, Pa. A new-type air-driven rotary longhole drill, tungsten carbide drill bits and chain conveyors are teamed in the new system for efficient mechanized mining of the middle split of the steeply pitching Mammoth vein.

DEVELOPING THE MINE

Development of the Hi-Test mine began in 1950 when work was started on the slope. To tap unmined coal remaining under an abandoned Philadelphia & Reading Coal & Iron Co. mine, considerable cleanup and development had to be done. New rock tunnels were driven to establish ventilation and provisions were made to handle water in the worked out area. Pumps had to be set in nearly inaccessible places, dams had to be constructed and pipelines laid.

After the slope was developed to a point approximately 100 ft below the abandoned workings, a gangway and monkey airway were started eastward along the strike in the 5½-ft vein of coal. As development of the first new level progressed, the slope also was advanced. A second monkey airway and gangway were driven 50 ft, slope distance, below the first level. The 50-ft block of coal between the two levels was to be extracted by the new longhole mining technique but chain pillars between airways and gangways were to be left in.

Monkey airways and gangways in each of the levels were driven on 20-ft centers, with airways 7 ft high and gangways 9 ft high. At 35-ft intervals, chutes were tapped through from the gangway to the airway to provide ventilation. In the second level, these chutes were funneled out at the airway and fitted with loading gates at the gangway to permit easy loading onto chain conveyors in the gangway.

PRESIDENT K. L. CURRAN emphasizes the increased safety with the new method.

Coal drilling in development work initially was done with a jackhammer but this later was replaced with an air-powered Thor Model 334 350-rpm hand-held rotary drill. Kennametal SB13 4 ft auger sections and Type D 1¾-in carbide bits were purchased for use with the hand-held rotary air drill.

A two man crew works each place in development, taking two 6-ft cuts per shift, setting timbers and extending the conveyor line. On-shift blasting is done with du Pont Lump Coal CC and delay blasting caps. Before the blast holes are charged, the chain conveyor is extended as near as possible to the face. Boards are placed over the tail section of the conveyor to prevent fouling of the chain by a heavy load of coal. By extending the conveyor to near the face, hand loading is kept to a minimum. When the coal outby the covered section of the conveyor is loaded out, the boards are removed and the remaining portion of the cut is placed on the conveyor with a minimum of effort.

After the second level was developed 750-ft to the property line, a chute was driven upward to connect the second-level airway with the first-level gangway. This set the stage for the new longhole type of mining.

NEW UNIT DRILLS LONGHOLES

An Ingersoll-Rand 4SJ 800-rpm rotary air drill, the first unit of this design in service in the mining industry, was purchased for the longhole

EXAMINING overhead coal at face is J. M. Burns, superintendent. Timbers and lagging are extended each cut.

CHAIN CONVEYORS carry longhole coal to counter chute for loading into skip. Chains also are used in development.

ROTARY AIR DRILL is used to bore eight holes per cut in development of gangways and airways.

DRILLING AND MINING contractor, Michael Semanchick, is an enthusiastic backer of longhole mining.

drilling job. Features of the new drill include a 4-ft aluminum feed shell powered by an air motor; pneumatic air column that holds the drill in position; and an auger holder that keeps auger sections in the hole while the feed shell is retracted and a new auger section added.

Only 6½ ft of clearance, or head room, is needed to operate the drill, a feature that permits openings to be held to a minimum area. Epuipped with 4-ft Kennametal AT16 longhole augers, CSA connectors and RDTC 2-in carbide bits, the unit drills an average 50-ft hole in 17 min. This is drilling time alone and does not include setting up the drill or removing augers after the hole is completed.

Rate of penetration varies because of the variation in physical characteristics of the coal. Since going into service in September, 1954, the best performance has been the drilling of a 50-ft hole in 11 min. Air flows through the hollow augers and keeps the cuttings in agitation, thus preventing packing around the bit and auger. This is especially helpful in wet or damp coal and has been an important factor in getting good penetration, management reports.

The drill is equipped with a Kennametal quick-change safety-drive socket. Weight of the augers is sufficient to make a satisfactory air seal between the socket and augers and thus the air is directed through the augers to the bit.

Longholes are drilled 18 to 24 in from the top of the coal and on not more than 6-ft centers and intersect the gangway of the level above. As many as five holes have been drilled in one shift, but two is an average. Seven or eight holes can be drilled before a bit becomes dull. In over 4 mo of operation no bits have been worn out.

When longhole drilling was started, five men were assigned to the section. Three were assigned to drilling, shooting and loading onto the chain conveyor while two worked at the loading pocket, transferring coal to the skip. As the men became more experienced and skilled in the new method, it became possible for a two-man crew to operate the drill and for one man to handle the skip-loading job. The other two men drive chutes for tapping coal.

LOADING AND BLASTING

Longholes are loaded from the top with 1½x8-in Monabel B powder when dry and with Monabel AA when wet. Holes are plugged at the bottom and eight bags of tamping are dropped to the bottom of the hole before powder is put in. Approximately 25 lb of explosives are distributed in each hole by putting one bag of stemming between each 5 or 6 sticks of powder. The first hole is detonated with an instantaneous cap, and each of the other holes by a millisecond delay. To assure complete detonation of the charge, Primacord is placed throughout the full length of each hole.

Each longhole yields an average of 52 long tons of coal. Now that the initial experimental work and training period is completed and a 750x50-ft block of coal has been extracted, management feels confident that the new block will be recovered at the rate of two longholes per shift. Output in the new level with a five-man crew has been 115 tons per shift, or 23 tons per man. About 104 tons are recovered from two longholes and the balance from chutes.

LOADING COAL BY GRAVITY

Blasted coal from the longholes falls into the monkey airway and thence to the chutes leading to the gangway. A tandem setup of Long and Herold chain conveyors in the gangway are loaded by gravity by opening gates installed in the chutes. Maximum length of each chain conveyor is set at 400 ft to prevent breakage of chains. The outby conveyor discharges into a counter chute that intersects the slope and serves as a storage pocket. The counter chute is driven 35 deg with the gangway to permit coal to flow into the skip by gravity.

Aside from the high output per man achieved with the longhole mining, men work under much safer conditions than in conventional pitch mining. The only time men work on the pitch is to drive chutes connecting the airway and gangway, or to drive the chute between two levels when starting a new longhole setup. Since all the coal between levels is extracted by longhole mining, men do not have to handle or set timbers on the pitch. And there is little—or no danger of men falling a great distance since they work mainly in the gangway and airway.

Ventilation is simplified as compared to the breast method of mining. After the chute is driven to connect the two levels there is no problem of ventilating the face because air flows freely between the levels.

Since no timbering is required in longhole mining except in level-development work, considerable savings are achieved in timber costs. Better control of mining also is possible with the new method. Workers know that each blasthole will yield a definite quantity of coal, whereas with conventional methods there is no control over the volume of coal broken. Frequently the coal runs and top or bottom rock dilutes the coal. Because of poor control over mining with other methods, percentage of recovery is less than with longhole mining.

DRILLING DEEPER

On the basis of results in initial longhole mining, management plans to increase the distances between levels and drill holes 70 ft deep to connect the levels instead of 50 ft as in the initial setup. The longer holes offer the advantages of decreasing the development work required per ton of coal recovered and increasing productive time for the drill. Approximately 40% fewer drill setups will be required and drilling time will be increased correspondingly with the longer holes. Therefore management expects output to be 40% greater.

ROOF CONTROL IMPROVED

Since longhole mining began in September, 1954, no trouble has been encountered with the roof. Management reports that little dilution with rock has occurred in recovering the 750-ft block of coal. With other more conventional methods of pitch mining, roof and bottom usually give trouble and consequently coal is diluted with rock.

In gangways and airways driven the full width of the vein, timbers are set on 5-ft centers with lagging or boards in between. Chutes are driven 6-ft wide and timbered on 4-ft centers.

Management reports a significant reduction in face labor costs after the initial experimental work with longholing. Much of the increase in efficiency can be credited to the fact that men no longer work on the pitch and are not required to carry heavy tools and materials up the 70-deg pitch. Once the development work is completed, maximum production can be achieved almost immediately.

If rock should appear in the loading chute, longholing is discontinued temporarily, a small pillar is left and a new chute is developed between the two levels. Longholing then proceeds as before. This procedure was carried out once in the initial longhole work and was successful in stopping the dilution.

Another important advantage of the new mining method is that men can be trained to operate the drill and carry out mining properly in a minimum of time. It took years for a man to become a skilled pitch miner but with the longhole method training time is much less.

APPLICATION OF THE NEW METHOD of sinking permitted new 79-ft shaft to be excavated at rate of 9½ ft per day once blastholes were drilled. Shaft wall was left unshattered and hazards to workers were minimized.

The New in Shaft-Sinking

Problem: Sinking a new 18-ft-diameter air shaft.

Solution: Drilling blastholes with a vertical overburden drill and removing broken rock with a clamshell.

Results: Greater safety for workers, excavation at the rate of 9½ ft per shift with a minimum of men, and a solid, unshattered shaft wall.

SINKING A SHAFT usually does not create much excitement. But when it is done by a new method that is much safer than conventional ways and considerably more economical, that's a different story.

Hanna Coal Co. sunk its first shaft with a clamshell at Piney Fork mine in 1944. It became quite evident that the most expensive phase of this work was the lowering and raising of men and the labor cost of drilling and shooting blastholes. Richard King, who was then foreman at Piney Fork No. 4 mine, discussed with James Reilly, who was then superintendent of the Piney Fork No. 1 mine, the possibility of a more efficient method.

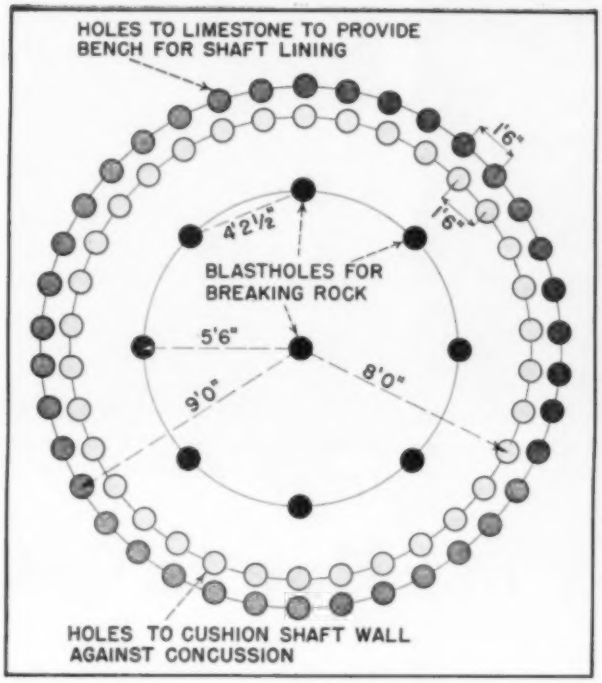
Later, Mr. King and J. S. (Casey) Harmon, general superintendent of stripping for Hanna, collaborated and came up with the method used in sinking the air shaft at the new Glen Castle mine. This method was discussed with Clyde Gibson, superintendent of underground mines, and Mr. Harmon was authorized to proceed with the work, using a vertical highwall overburden drill. He advocated that a series of 8½-in holes be drilled on 18-in centers around the circumference of the proposed shaft. These would serve to protect or cushion the shaft wall against concussion from the explosives used to break the rock within the circle. It was his belief that the inner core of rock could be smashed with explosives and at the same time the shaft wall could be sheared without shattering.

WHAT THE RESULTS WERE

When the 79-ft shaft was completed and the facts and figures were examined, a very favorable picture took shape. The shaft had been sunk with a minimum of manpower—a two-man crew drilled all the blastholes and a three-man team, supplemented by two shooters, for about 1½ hr each shift, blasted and removed the rock. A solid shaft wall that required less than a man-shift to scale it free of loose rock was produced. After gaining experience, the men excavated the rock at the rate of 9½ ft per 7½-hr shift, exclusive of drilling. Safety was improved because excavation was carried out without a man being in the shaft except for cleanup work.

HOW THE JOB WAS DONE

A Joy Champion rotary dry-type overburden drill was moved from one of Hanna's strip pits to the shaft site. A drilling pattern was worked out by Mr. Harmon, and an engineering drawing was made of the proposed pattern to help the drillers locate the holes accurately. Hanna's engineers located the center of the shaft on the surface and holes were laid out on 18-in centers on the circumferences of circles with 8-ft and 9-ft radii.



HOLE PATTERN for drilling with rotary overburden drill includes two outer circles to cushion the wall against shock. Inner holes were for shooting.

SHAFT-SINKERS—A. Metro (left), M. Rensi, J. Lachendro Jr., H. Chambon, W. Kubinsky, J. S. Harmon, general superintendent, and H. Stanley.

Holes along the circumference of the outer circle were drilled only as far as the top of the limestone bed in the group of rocks overlying the coal. This outer circle of holes was drilled to provide a narrow bench of limestone on which would be placed a steel shaft lining. The inner group of holes penetrated to the coal seam. To get good fragmentation of the rock within the cushioning circle, eight blastholes were equally spaced about the circumference of a 5½-ft-radius circle and a ninth hole was bored at the center of the proposed shaft.

Two men operated the drill, putting down an average of 350 ft of 8½-in hole per shift. Considerable water was encountered during the drilling and, as a result, drilling was slowed. Mr. Harmon is confident that at least twice as much footage could have been drilled per day if no water had been present.

As soon as one blasthole was completed, it was filled with limestone chips. After all holes had been drilled and filled with chips, a clamshell with a 2-cu yd bucket was put to work removing approximately 12 ft of earth and soft material that did not require blasting. Then a section of 1-in-diameter air hose was connected to the air compressor on the drill and fitted with a reducer and 12-ft length of ¾-in pipe. The pipe was placed in a blasthole and the top 3 ft of limestone chips were flushed out. The air was turned off and a piece of 2-in hose was substituted for the 1-in line and a 12-ft length of 1½-in pipe was connected to it. After the air was again turned on, the 1½-in pipe was put down in the hole and the limestone chips were removed to a depth of 10-ft. Only two minutes were required to flush a 10-ft section of hole.

Each of the first 10-ft sections of cleaned blastholes was charged with 12½ lb of explosives and all were connected with Primacord and detonated simultaneously. No shattering of the wall resulted from the initial blast and, as an experiment, the charge was doubled in the second 10-ft round. The rock was broken so well without shattering the wall that no pick work was required to remove loose rock from the wall. On the basis of this result, all succeeding rounds were charged the same.

It was not necessary to have a worker in the hole at any time during the excavation except to load one 2-cu yd bucket with scattered loose material the clamshell could not pick up.

The cycle in a work day began with loading out the rock which had been blasted at the end of the previous shift. Then holes were cleaned for the next 10 ft, loaded with explosives and detonated. A grouting pump then was started at the end of the shift to keep the water out of the shaft.

Now that experience has been gained in this type of shaft-sinking, Mr. Harmon is confident that certain changes in procedure would produce even better results. Among the modifications he suggests are:

1. Elimination of the outer circle of holes. One row of holes would be ample to prevent shattering of the shaft wall and the liner could be placed on steel pins fitted into 2-in-diameter holes drilled horizontally into the wall. Concrete poured between the liner and the wall would bind them together and the liner would not slip, Mr. Harmon believes.

2. If water is encountered, some improvement in excavating could be achieved by changing the work cycle as follows: start the shift by cleaning blastholes, follow immediately with charging and detonating holes, and excavate material at the end of the shift instead of leaving it overnight. The pump would be operated between work shifts. This work cycle would permit the clamshell to load comparatively dry material whereas the broken rock was saturated when left overnight.

3. Fill the blastholes with sand instead of limestone chips. The limestone had a tendency to pack and therefore hole cleaning was slowed.

On the basis of results achieved with this method of shaft sinking, Mr. Harmon and other members of the Hanna staff feel confident that the method could be used successfully to sink larger and deeper shafts.

MORE THAN DOUBLE rope life resulted from installing this drop oiler to the head sheave of a dragline uncovering coal in Ohio.

CORRUGATED SHEAVE takes a heavy toll in rope life.

SISTER SHEAVES on drag boom prevent hoist rope slapping under fluctuating load and extends rope life while preventing breakage of tubular section of boom.

LONGER ROPE LIFE resulted from installation of this self-aligning direct-pulling car hoist anchored to compression coil springs.

How to Get

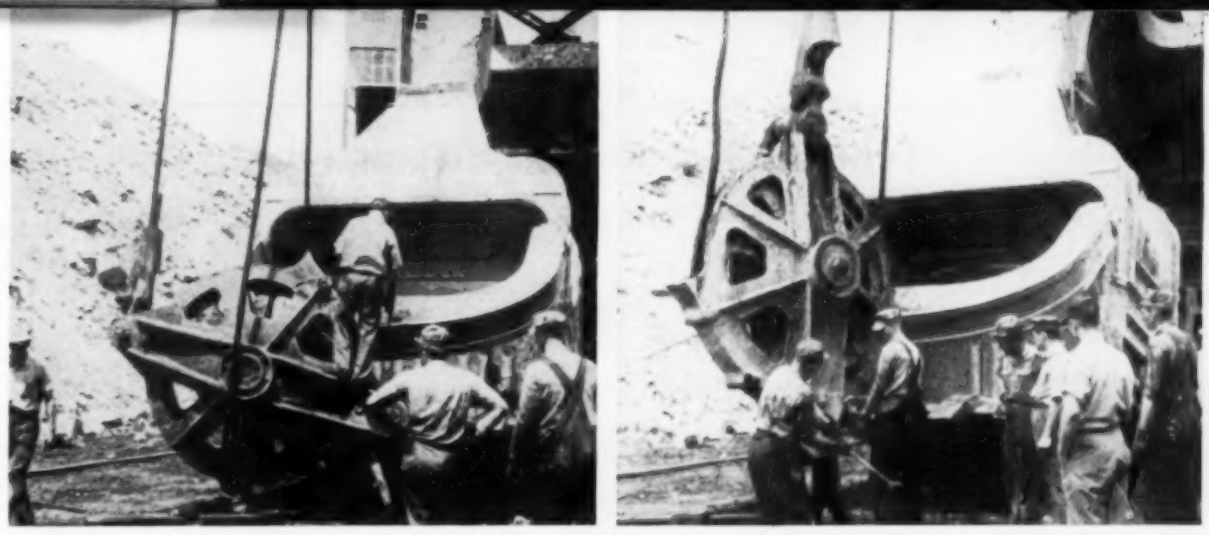
This article hits the high spots of economical usage of wire rope for all mining needs. Considerable savings can be made by taking advantage of these suggestions.

However, it must be remembered that there is no cure-all method and the best advice is obtained by keeping in close contact with your source of supply and seeking out and accepting the help good wire rope engineers can offer.

We are pleased to present this article because it represents material gained from many years of practical engineering experience. We are indebted to Macwhyte Co. and Wm. C. Russell, chief wire rope product engineer, who worked with the author, A. E. Flowers, associate editor, COAL AGE, in developing this forthright article.

HAVE YOU recently looked into the performance of the wire ropes around your property? If you haven't, the chances are that you aren't getting your money's worth from them. Why not make it a point to check how your ropes are being handled?

But first, start a little farther back, because the savings begin with selecting the correct rope for the specific job, and thus taking the first step to longer rope life. There is no such thing as an all-purpose rope. If you aren't sure whether you are using the correct rope ask for engineering assistance from your wire rope manu-



LIFTING the padlock sheave of a 35-yd shovel into position with this hoist rope may have speeded the job but look what happened to this $2,000 rope. The kink is clearly shown in the right photo.

More Life From Wire Rope

- **What you should know about wire rope construction**
- **How ropes are abused**
- **Practical suggestions for extending rope life**

facturer. He will be glad to help you.

After you have selected the proper rope for the job, investigate to see if it is being treated properly. Abuse and neglect shorten the life of a wire rope. Common types of abuse include neglect during storage, improper unreeling and winding, sloppy wrapping on the hoist drum, rubbing against guides, guards and structural members, running over worn or wrong-size sheaves, and careless operation. Lack of lubrication is often nothing more than neglect.

STORE ROPES PROPERLY

Wire rope is a highly finished steel product and therefore is subject to rust and corrosion if exposed to the elements. It certainly makes sense to prevent your dollars from rusting away by storing both new and used rope under cover, protected from rain or moisture. Used rope that still has some useful life should be kept coiled, lubricated and free of kinks or twists. If the rope is large or long, it would pay to rewind it on a spool.

UNREELING, WINDING AND HANDLING

Improper unreeling from the spool or coil frequently causes damage to wire rope before it goes into service. Here are some suggestions for handling rope that may save you money.

Never remove rope from a reel or coil it by throwing it off in loops. This causes kinking and twisting which results from the rope taking a spiral shape because of unnatural twist in the rope. When rope is kinked, strands and wires are out of position, which creates unequal tension and results in excessive wear at this part of the rope.

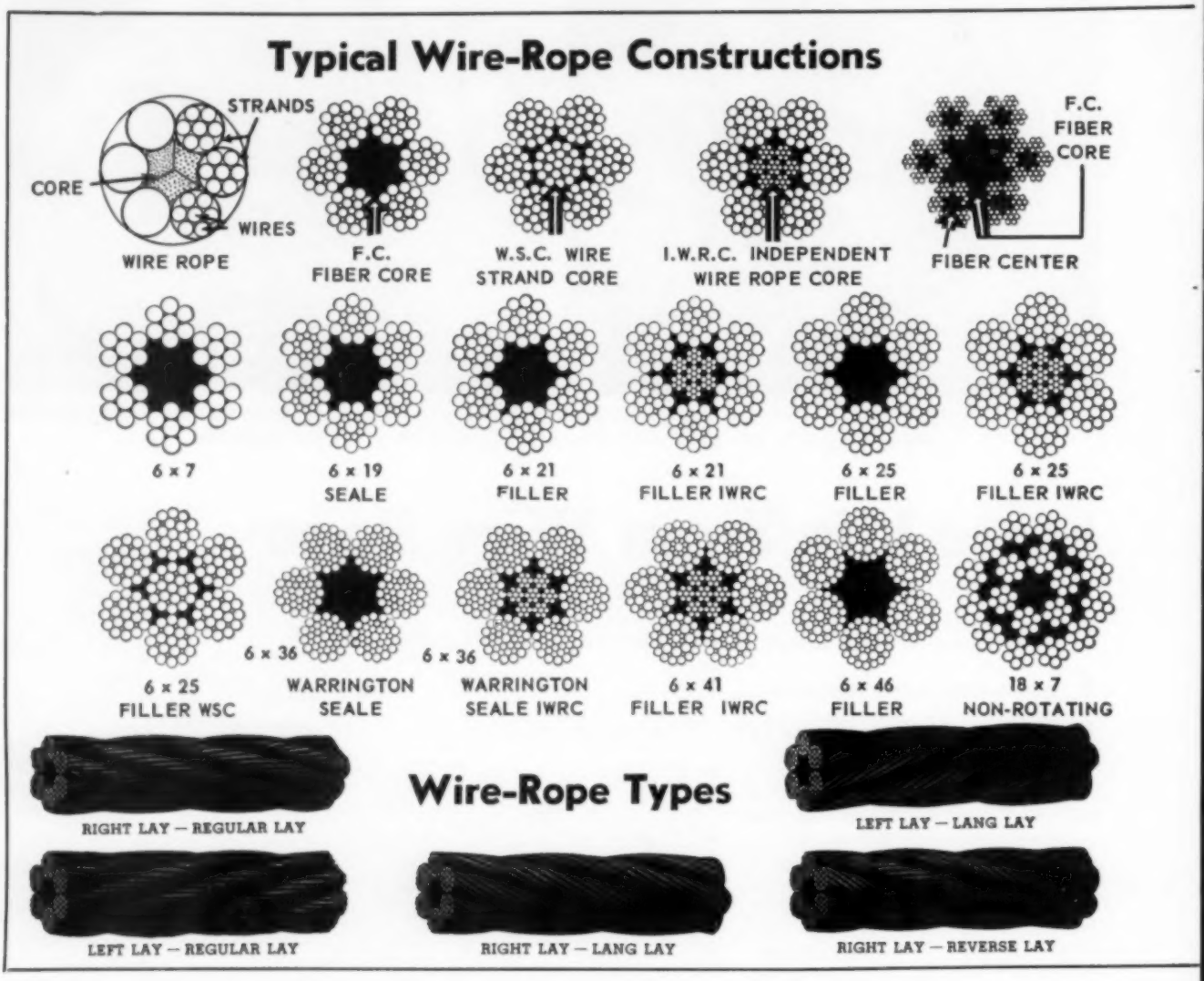
Even though a kink may be straightened out so that the damage appears to be slight, the relative adjustment between the strands has been disturbed so that the rope cannot give maximum service.

If the rope is on a reel, jack it up on a horizontal axle so the rope can be pulled off as the reel revolves. If you are going to wind the rope over the top of the drum, mount the reel so it unwinds over the top also. If the drum is to be wound from the bottom, the rope should be unwound from the bottom of the reel. Remove rope from coils by rolling the coil along the ground. But keep it out of dirt and sand which will cut and grind away the metal if it sticks to the rope after it is put on the machine.

Everybody gets excited when a rope fails on the job and all are in a hurry to get the unit back in production. But hurry or not, keep looking back over the rope and watch the spool or coil. However, don't focus all your attention there because there is also danger of damage at the point where the rope enters the reeving end of the machine. As a matter of fact, ropes are sometimes kinked unknowingly because the operator was watching only one end. Installing a wire rope is like approaching a railroad crossing. You should look both ways. Remember that a little time spent during installation may save a sizable sum of money in good performance later.

Wire ropes should be stored indoors in a dry place if possible. Large ropes that are stored outdoors should be raised off the ground, or set on a wooden platform. If they are stored on the ground, the underside of the reel is susceptible to moisture and corrosive conditions. The rope also, should be protected from the weather by a covering. The paper wrapping put around the reel by the manufacturer is sufficient to prevent contact with dirt and moisture while in transit, but will not serve as sufficient protection against abuse and the elements during an extended period of outdoor storage. Rain or snow is likely to penetrate around the cover and become pocketed in the wrapping at the lower side of the reel, thus trapping moisture in the package and promoting, rather than retarding, corrosion.

To meet this condition, build a simple water-tight shed over the rope or place a galvanized corrugated steel covering over the reel and puncture the paper wrapping on the bottom or remove it altogether. Coils of rope should not be stored on the floor where they will be damaged by equipment running over them, but hung



on pins or stored in racks for easy access and identification.

Proper storage doesn't end with protecting the ropes. There remains the job of identifying each rope. A tag should be placed on each with enough information to permit quick positive identification. It is very easy for a worker to pick up the wrong rope, especially if there is an emergency. Simply because a rope has the same diameter as the one needed does not mean that it is the same construction.

GOOD OPERATION PAYS

Skillful operation of equipment can be of real help in getting longer rope life. Careless operation frequently is indicated by improper spooling on the drum. For example, crisscrossing of the rope on drums will cut and crush wires and thereby weaken the rope. If a rope repeatedly jumps out of drum grooves, the trouble may lie in letting the drum run too freely or the rope may be too stiff for the job. In either case, the condition is not too difficult to correct and the correction should be made as soon as the trouble is spotted.

Shock loads that overstress the rope should be avoided. If a load is suddenly applied to slack rope the shock may exceed the rope's elastic limit. This may not result in an immediate failure, but the rope may fail later when a different operator is on the machine. Shock loads can be avoided by making sure there is no slack and no jerking of the rope. Loads should be watched carefully to see that they do not exceed the rope's working load. The rope should not be permitted to become fouled or damaged either on the drum or by jumping the sheave. Loads should be started carefully because too rapid acceleration overloads the rope. Power should be applied smoothly and steadily.

Each machine operator should be instructed in the importance of avoiding shock loads and the dangers of mistreating rope. A good, conscientious operator is an invaluable asset in getting longer rope life.

MAKING SHAFT ROPES LAST LONGER

Although most shaft hoist ropes are wound on drums in a single layer there are some multiple-layer units. And it is with multiple-layer winding that trouble sometimes develops in one spot—that is, where the rope climbs from one layer to the next. To prolong the life of a rope used in multiple-layer service, it is recommended that the rope periodically be detached from the drum and a section cut off to change the point of climbing.

After a new rope is put on there is a reduction in diameter as a result of the compacting of the strands around the core and an initial stretch in the rope. This reduction in diameter takes place before there is any appreciable rope wear and the diameter measured after this initial stretch can be used as a basis from

New Terms Make Wire Rope Descriptions More Precise

As machinery becomes more complex in response to changing industrial requirements, new ropes are required to meet the new and more exacting conditions. The types of rope constructions have become more numerous, and to distinguish between them rope manufacturers have had to develop more accurate descriptions.

The 6x19 rope is an example. For many years, manufacturers have been supplying an improved 6x19 construction containing filler wires. But since the rope was sold under a 6x19 classification, these small wires were not counted in the description. However, as the demand on rope for various applications became more exacting, it became necessary to be more specific in describing the various constructions. To do this accurately, it became necessary to count all the wires in the strand. For example, a 6x16 filler construction became a 6x21 filler and a 6x19 filler became a 6x25 filler. Wire rope manufacturers in cooperation with the National Bureau of Standards also have adopted new definitions for certain terms in addition to providing more precise descriptions for rope construction. These include the following:

Center—A term formerly used indiscriminately to refer to the core of both wire rope and individual strands, "center" now refers to the center of the strands.

Core—Formerly used to refer to the heart, center or core of a wire rope or strand, "core" now applies to the core of the wire rope only.

Hemp—Formerly loosely applied to hemp, sisal, java, manila or other fiber cores, "hemp" has been dropped in favor of "fiber."

Fiber—Now refers to any fiber core or fiber center, whether of hemp, java, sisal, manila, jute, cotton or other vegetable fibrous material. "Hemp Center" in a wire rope now becomes "Fiber Core," with the abbreviation "F.C." "Hemp Center" in a strand now becomes "Fiber Center." "Independent Wire Rope Center" now becomes "Independent Wire Rope Core," with the abbreviation I.W.R.C. retained. "Wire Strand Center" now becomes Wire Strand Core," with the abbreviation W.S.C.

Useful Rope Definitions

Wire—A single continuous length of metal cold drawn from a rod.

Core—Member of a wire rope about which the strands are laid. It may be fiber, a wire strand or an independent wire rope.

Wire Rope—Several strands laid helically around an axis, or core.

Strand—An arrangement of wires laid helically about an axis, or about another wire or fiber center, to produce a symmetrical section.

Cable—An indeterminate name incorrectly used for wire ropes but common in certain fields of service. Correctly, it applies to a composite unit, such as a telephone cable or a bridge cable composed of straight strands or twisted elements—fibrous or metal—bound together to form a unit.

Lang Lay Rope—Wire rope in which the wires in strands and the strands in the rope are laid in the same direction.

Regular Lay Rope—Wire rope in which the wires in the strands and the strands in the rope are laid in opposite directions.

Fatigue—Cracks forming in the steel wires and increasing in size as the rope is flexed or loaded until the wires break completely.

Abrasion—Wear, either a cutting or grinding away of the material or a plastic flow of the metal on the surface of the rope. Grinding of the material results in a reduced cross-sectional area, while plastic flow is a result of the cold flow of the metal with no change in area. For instance, plastic flow results from the peening effect of small rollers on a long slope rope.

which to determine future wear. The diameter of the rope as fabricated can be obtained from the manufacturer and the diameter after the initial set can be measured on the job. Any further reduction in diameter is then the result of wear.

While abrasive wear is by no means the whole story in the life of a shaft rope, it does help to determine the end point of its useful service and the rate of decrease in diameter is a valuable aid in rope inspection.

But if a rope corrodes internally, there will be a further reduction in metallic area. Corrosion is the big enemy of shaft ropes and is dangerous because it often can't be seen. Sometimes a looseness develops in the outer wires of the strands. Close inspection will sometimes reveal ragged edges along the contact between the outer wires and this is an indication of internal corrosion. By inserting a sharp-pointed screw driver or pointed tool between the wires, internal corrosion sometimes is indicated by outer wires moving back and forth easily when the tool is inserted. If these symptons are detected, the rope should be taken out of service immediately. This internal corrosion can be prevented by thorough and adequate lubrication.

The section of rope adjacent to the cage or skip connection is subject to vibration and fatigue and good operating practice requires cutting a short section from this end every few months.

IMPROVING SLOPE-ROPE LIFE

Most slope ropes are wound in multiple layers on the hoist drum and the ropes suffer from such things as wear at the point where the rope climbs to the next layer, haphazard winding, or improper fleet angle. Cutting off a section at the drum end that is an uneven multiple of the drum circumference to bring a new section of rope at the point of wear will help increase rope life. Reducing or equalizing a large fleet angle will make for better winding and will reduce crisscrossing or uneven spooling.

Worn sheaves are deadly to ropes. If the groove of the large head sheave at the top of the slope wears, it will cause extra wear to the rope. Grooves should be smooth and must be slightly larger than the diameter of the rope to prevent pinching and excessive wear.

Periodically inspect your sheaves and recondition them. Make sure the sheave runs true and does not wobble on its bearing. Keep the groove free from roughness or burrs of any kind. Make sure the groove is larger than the rope. Be sure that the sheave groove is made of material that will stand up under the rope pressures encountered.

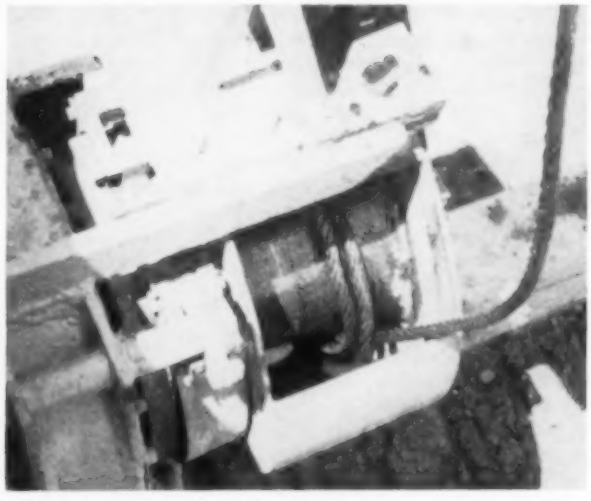
Corrugations in a sheave groove are an indication that the sheave is too small or the material in the groove is too soft. Although corrugations are caused by wire rope, the rope will not properly engage these corrugations. A

ABUSE RESULTED in a chewed-up rope long before any significant signs of normal wear appeared on the wires.

LACK OF LUBRICATION caused this rope to fail when it became rustbound internally.

DRUM ABRASION ruined this rope. It was scuffed repeatedly over and against previous wraps on drum.

SHORT LIFE results from a wire rope being wound around a drum in this haphazard fashion.



WAITING FOR TROUBLE—A jerk on the rope is certain wherever drum winding leaves slack like this.

Avoid These Abuses of Your Wire Rope

slight twist of the rope or a small change of lay will prevent wire rope from tracking in the corrugation. Thereafter, the rope will wear more than normal.

Also remember that the deeper a groove wears, the more the rope is pinched, friction is increased and the rope is forced to do more than its normal work. The result is less life.

Supporting sheaves also should be given close attention if you expect to get the most from your rope. If they are made of cast iron they wear rapidly and cause excessive rope wear. Rubber-lined sheaves with a long hub or antifriction bearings will stand up better and at the same time will be easier on the rope.

Slope rollers are a constant problem and require a great deal of maintenance if they are made of wood. Wrecked cars knock them out and frequently they are not replaced as quickly as they should be. Metal rollers are frequently used but should be correctly engineered to avoid undue wear to the rope.

If the roller diameter is less than nine times the rope diameter there can be serious trouble from peening action which hardens and embrittles the rope. The harder and more substantial the material in the roller, the more important it is that the roller be of the proper diameter to prevent peening. It is difficult to get large enough diameters for the rollers because of the limited space in which they must be installed. Another problem encountered with slope rollers is freezing or sticking, either by water freezing in the roller pocket, or by the caking of fine coal or dirt.

To avoid these problems with slope rollers it has been found that planks or scrubbing boards are a very satisfactory substitute. These should be made of hard wood and should be placed so that the rope travels with the grain. Then, with adequate lubrication, the surface of the board will become impregnated with grease and there will be a minimum of wear.

BREAK-IN PERIOD IMPORTANT

Both shaft and slope hoist ropes sometimes become twisty or cranky after being used a short time.

This is because of the lengthening of lay as the rope stretches and pulls down in diameter. To relieve this condition the rope is detached from the load and allowed to untwist.

For shaft ropes, complete details of this procedure are given in U. S. Bureau of Mines Circular 61.

For slope ropes, this twist usually concentrates near the skip and if not relieved in time the untwisting of the main portion of the rope cannot work out through the end, with the result

STUCK ROLLER can ruin a rope. Avoid by proper maintenance.

RAGGED EDGES on this bucket bail will soon tear out wires and ruin rope.

that the section adjacent to the load will twist up and become crooked and kinky. Subsequent wear concentrating at the crooked places will require cutting off a section or replacing the entire rope prematurely.

Periodically detaching the rope from the skip and allowing it to rotate and free itself will relieve this condition.

For permanently attached cars, good operating procedure would involve use of a swivel which would permit the rope to rotate and free itself as the constructional stretch comes out. However, if a swivel is used it should be equipped with a locking pin so that after the break-in period the swivel can be locked to prevent excessive rotation and loss of lay in the rope.

Slope ropes usually show the most wear in the first 100 ft above the car, and the rope should be long enough so that this portion of the rope can be cut off after it has become worn, thereby increasing service life.

GETTING MORE FROM SMALL HOIST ROPES

A rugged abuse-proof construction is needed for car-puller ropes. It is almost impossible to operate a car puller in such a manner that the rope will not be mistreated. Since the job of moving the car is more important than getting long rope life, there isn't too much that can be done to improve rope life. Manufacturers usually recommend that a rope coarser than a 6x25 be used because it lasts longer for this type of service. In general, a coarser strand than usual will result in longer rope life.

Where layer-loading hoists are installed at preparation plants, ropes also are subjected to abuse. They are exposed to the elements for 24 hr per day and are dragged through fine coal dust and dirt. Frequently a group of empty cars will be dropped against a loaded car held by a car-puller rope. As a result, ropes are overstressed and sometimes broken. A heavy coil spring installed in the reeving system will reduce the shock load and increase rope life.

MORE LIFE FOR STRIP ROPES

Increasing the life of rope on stripping equipment begins with proper handling when the rope is installed and is continued by proper application of lubricants throughout its service life.

Wire ropes used on today's modern large-capacity draglines and shovels represent a considerable investment. For example, a 2¾-in rope used on a 30-yd dragline costs about $2,000. You can't afford to mistreat them if you want to keep your maintenance cost down.

One of the greatest opportunities for increasing rope life lies in lubricating the rope properly and systematically. Proper lubrication is nothing more than applying a light oil—a little at a time—and frequently. There is often a tendency to put too much lubricant on the rope in belief that the interval between applications can be extended. Too much oil may be a detriment.

It sometimes appears unprofitable to lubricate a drag rope, but it can be done. The key to successful drag-rope lubrication is application of a small quantity of light oil applied continuously or at frequent intervals, and well distributed, the purpose being to get penetration before it gets wiped off.

A drag rope wears out near the socket, or crow's foot, and standard practice is to anticipate breakage at this point and cut off about 10 ft of rope before it fails. After one or more of these cutoffs, the rope should be turned end for end. It is wise operating practice to buy a rope that is long enough to fill one complete layer on the drum and also permit several cutoffs before the rope is discarded.

The fairlead on a dragline should be so positioned with respect to the drum as to divide the fleet angle, thus keeping wear at the groove flanges at a minimum. If the fleet angle is all one way, wear may be great. It will pay to check with the manufacturer of the machine for the best setup for your equipment.

With drag ropes it is best to avoid more than one layer of rope on the drum if possible, since multiple layer windings reduces rope life—sometimes by as much as 50%.

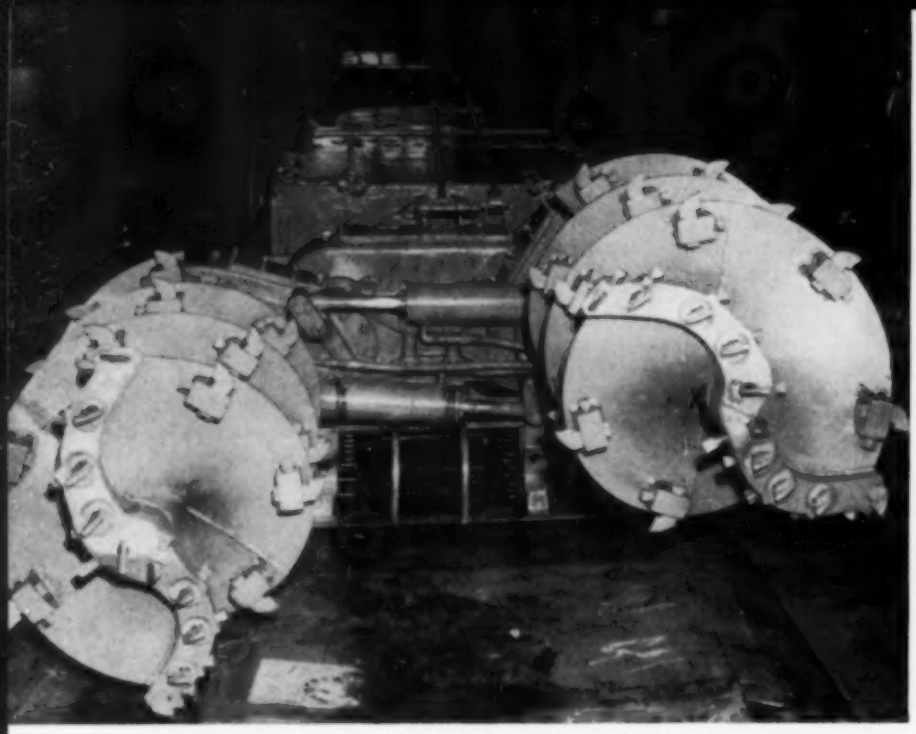
Don't neglect your sheaves and drum grooves. They should be maintained at recommended contours and should be checked periodically with a sheave groove gage to see that they are up to standard.

A fluctuating load on the hoist rope of large draglines causes the rope to slap violently against the boom. Supporting sheaves or rollers do not stand up long under this treatment, nor does the rope. Rope life sometimes is lengthened by using discarded tire casings laid flat on the boom to cushion the shock. In other instances, a pair of sister sheaves have been installed on the boom to hold the rope down and prevent slapping. In addition to increasing rope life, the sister sheaves have prevented damage to the boom.

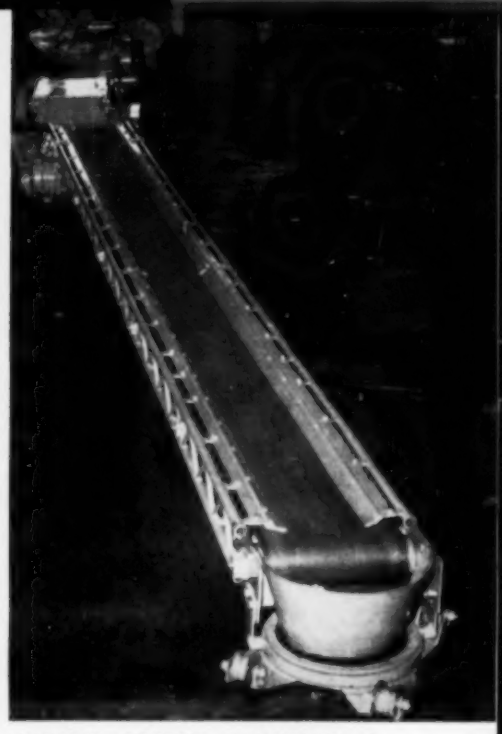
All large-diameter ropes on large excavators are Lang Lay, and when the wires break, as they eventually will, the protruding ends should be broken off with a pair of pliers at the line of contact between strands. If this isn't done, the broken wire will lay across adjacent wires, and when the rope passes onto a drum or sheave, the protruding wire will notch those adjacent, hastening their breaking. You can readily see this will shorten the life of a rope.

BREAKING-IN EXTENDS ROPE LIFE

All the wires and strands in a wire rope must work together smoothly. A short breaking-in period under a light load and at a slow speed permits the components to adjust themselves and adapt themselves to the job. The rope becomes accustomed to the various bends and, in effect, fits itself to the reeving and gets ready for the work ahead. End attachments can be tested, and adjusted if necessary, before maximum loads are imposed. The actual time consumed in breaking in a rope is small in comparison to the time it takes to install a rope. And it can pay off in longer rope life.



BUSINESS END, powered by standard shortwall unit, shows one auger up and other down, with gathering chain at bottom.



SPECIAL BRIDGE CONVEYOR delivers coal to room unit.

The Wilcox Miner

Auger Head . . . . Shortwall Operation

DUAL AUGERS for mining, the shortwall principle of operation at the face, and bridge-conveyor equipment for the initial transportation stage are among the features of the new Wilcox miner, named for its inventor, A. G. Wilcox, president, Wilcox Coal Co., Shady Springs district, Raleigh County, West Virginia. With an overall height of 26 in, and operating on the same principle, the new continuous-mining unit may be used wherever a shortwall cutter may be employed.

The machine is now undergoing tests in the Wilcox mine and the preliminary results, Mr. Wilcox reports, bear out the forecasts of production and cost, including ability to produce 150 tons of clean coal per shift with a three-man crew. Other features and benefits are outlined by Mr. Wilcox as follows:

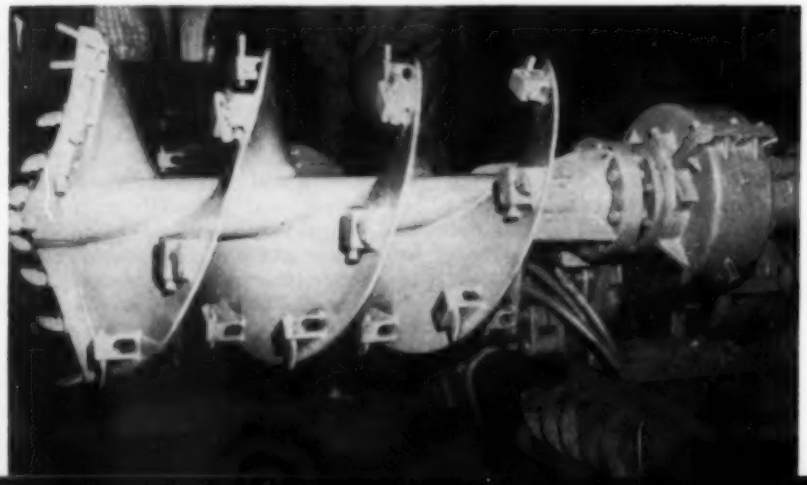
1. Extension of continuous mining to the smaller operation, since the machine may be installed at much less cost than other continuous-mining systems. Also, the design meets the needs of these smaller properties and, Mr. Wilcox notes, promises to go far toward eliminating the high costs and low unit production normally characterizing such limited-production operations. Thus, he continues, the miner may solve the problems of the small mine operator and determine whether or not he can continue in the coal business.

2. In contrast to other continuous-mining systems, the machine is self-contained and requires only the addition of a room conveyor, or shuttle car if preferred.

3. Operating flexibility permits the unit to dodge bone and rock partings, thus producing a clean coal with no further preparation.

4. Sturdy construction adapts the machine to rough usage, while simplified design also simplifies maintenance.

BITS ON NOSE and scroll and reciprocating motion remove the coal.

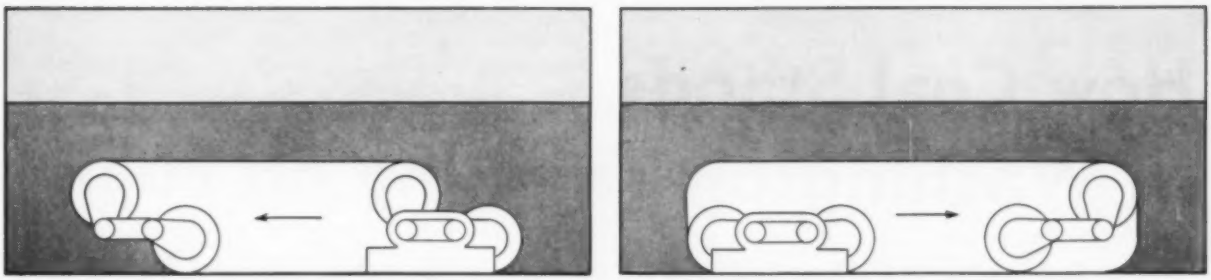


MINER DESIGN

Basically, the Wilcox miner, patent applied for, consists of three elements, all mounted on a steel-plate skid base to permit shortwall-type manipulation at the face. The elements are as follows:

1. POWER UNIT, consisting of a Goodman 512 chassis with cutter bar removed.

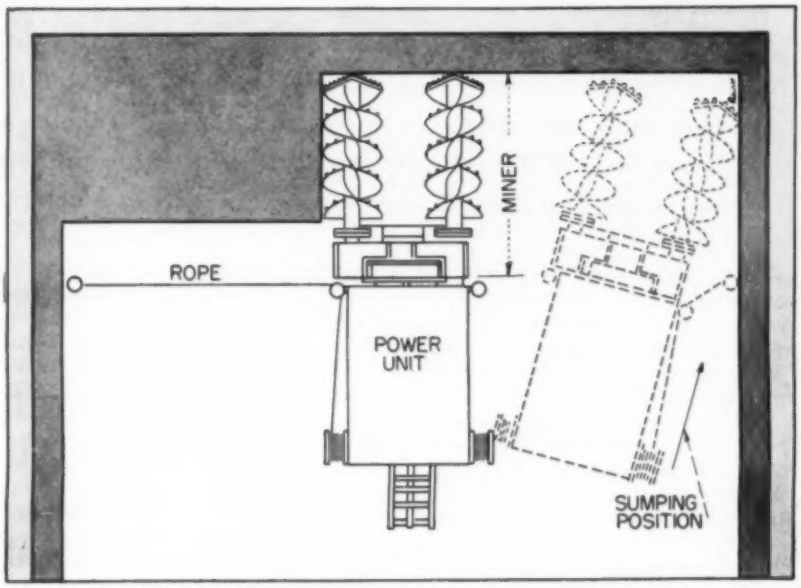
2. MINING HEAD, consisting of augers with necessary operating gear mounted in front of the power unit. Two augers 42 in long are employed for the actual mining operation. Bits around the scroll edges of each auger make them, in effect, rotary cutter bars, with the auger flights also acting as conveyors to move the coal back to the gathering conveyor on the machine. The augers, the reduction gearing which drives them, and hydraulic jacks for positioning the



AUGER ARRANGEMENT for thick-seam operation.

augers are mounted on a base resting on rails on the bedplate. An oscillating mechanism advances and retracts the assembly, imparting a 1½-in stroke to the cutting head and eliminating binding in the coal. The augers rotate in opposite direction and the oscillating motion helps break the coal loose, in addition to controlling the particle size. A jack for each auger can be used to elevate one above the other and thus adjust to the thickness of the coal being mined. With 24-in augers, face height ranges from 26 to 40 in; 30-in augers, 32 to 46 in.

3. DISCHARGE CONVEYOR, driven by a 5-hp motor, receives coal from the gathering chain and passes it on to the transportation unit. The discharge conveyor may be removed to adapt the unit to other forms of transportation, but is designed to accommodate and feed to a bridge unit, in turn feeding to a room conveyor.



MINING WITH THE NEW UNIT, which uses the shortwall principle.

MINING PLAN

At the face, the Wilcox miner operates on the shortwall principle using the sheaves, drums and ropes already available on the shortwall power unit. In other words, jacks are set and the machine is sumped in 42 in. It then mines across the face to the opposite rib, whereupon the cycle is repeated. By raising or lowering one or the other of the augers, the operator can compensate for changes in coal thickness or unevenness of the roof or floor.

Where the seams are split by partings with 26 to 40 in of coal between or below such partings, Mr. Wilcox feels that the machine should be especially beneficial, since it would take out the clean coal and leave the partings for separate handling if desired. "I do not think there is any miner on the market today," said Mr. Wilcox, "that can equal it for mining clean coal in split seams. I am confident that this machine will produce coal from these low seams cheaper than any other machine on the market today." And, Mr. Wilcox continues, maintenance should be low because of sturdy construction and the fact that any electrician or mechanic familiar with a cutting machine can make any necessary repairs.

MEN BEHIND THE MINER—William Henson, chief engineer; A. G. Wilcox; A. G. Wilcox, Jr., machine-shop foreman; and Joseph Legowsky, draftsman.

Mr. Wilcox' associates in the design and construction of the miner were William Henson, chief engineer; Joseph Legowsky, draftsman; Forest Hill, electrical engineer; and A. G. Wilcox Jr., machine-shop foreman. The original production model was built by the Orelite Mfg. Co., Raleigh, W. Va., which will continue to manufacture it. To meet the demand, however, Mr. Wilcox expects to contract construction to other manufacturers because of the limited facilities of the Orelite plant. A new company, The Wilcox Mfg. Co., has been organized to handle the sale of the machine.

How Coal Stands In Washington Thinking on Fuels

Released by the White House at 11 am Feb. 26, the cabinet "Report on Energy Supplies and Resources Policy" puts administration backing behind many of the steps coal has long been advocating to eliminate discrimination, restore competitive fairness, and maintain strength for national defense. It provides both a blueprint and an incentive for action, which already are being reflected in increased support for legislation and administrative correction of past policies and practices discriminating against coal. In the following material, the text of the report is shown in regular type, with comments and reports on developments in black-face type and shorter lines.

THE IMPORTANCE of energy to a strong and growing economy is clear. As conditions of supplies and reserves of coal, oil and natural gas change, and as both defense and peacetime requirements come more clearly into focus, the bearing of government policies upon energy needs re-examination.

What degree and kind of public regulation is appropriate to the present situation and future outlook? What trade policies for energy supplies will effectively express the overlapping national needs for adequate, protectible supplies in case of war and for encouragement of economic growth of this country and friendly countries elsewhere in the world? What steps may be taken to improve the economic position of the coal industry, now seriously depressed, without penalizing competing industries, as a means of enhancing the ability of that industry to contribute to national defense? More particularly, should specific changes be made in tax, freight-rate, research, government purchasing, or other policies in the energy field?

These and other policy questions press for careful review and decision.

In refreshing contrast to many other reports—governmental, Congressional and private—which have tended to damn the coal industry out of hand or smother it with double talk—this latest document actually comes to grips with the problems the coal industry cannot solve by itself and lays it on the line as to what should be done. Thus it provides official backing for efforts to correct, among other things, the very evident discrimination of government departments and agencies in favor of water power, oil and gas, topped off by overt encouragement of natural-gas expansion.

On July 30, 1954, the President established an Advisory Committee on Energy Supplies and Resources Policy. The director of the Office of Defense Mobilization was designated as chairman and the heads of the following agencies served as members: Departments of State, Treasury, Defense, Justice, the Interior, Commerce and Labor. The White House directive respecting the committee's assignment included the following specific statements:

"At the direction of the President the committee will undertake a study to evaluate all factors pertaining to the continued development of energy supplies and resources fuels in the United States, with the aim of strengthening the national defense, providing orderly industrial growth, and assuring ample supplies for our expanding national economy and for any future emergency.

"The committee will review factors affecting the requirements and supplies of the major sources of energy, including: coal (anthracite, bituminous and lignite, as well as coke, coke tars and synthetic liquid fuels) petroleum and natural gas."

The committee has been aided greatly by an able and representative task force appointed pursuant to the President's instruction. The committee's recommendations are set forth below.

Members of the task force included Dr. C. J. Potter, president, Rochester & Pittsburgh Coal Co., who was responsible for the coal studies. John E. Warren, National City Bank, N. Y., supplied the petroleum and gas data, and the task force was headed by James F. Brownlee, a partner in J. H. Whitney & Co., New York, and a director of several food corporations.

Recommendations

1. NATURAL-GAS REGULATION

We believe the problem of natural-gas regulation should be approached from the viewpoint of assuring adequate supplies and the discovery and development of additional reserves to support such supplies, in the interests of national defense, an expanding domestic economy, and reasonable prices to consumers.

To secure these objectives, it is essential to give due consideration to (1) the operations known as the production of natural gas, (2) the transportation of natural gas in interstate transmission lines, and (3) the distribution of gas in municipalities. Individual companies may engage in more than one of these activities. Each operation of such companies should be treated by like criteria according to its appropiate industry function.

In the production of natural gas it is important that sound conservation practices be continued. This area of conservation management is under the jurisdiction of state conservation commissions. In the interest of a sound fuels policy and the protection of the national defense

and consumer interests by assuring such a continued exploration for and development of adequate reserves as to provide an adequate supply of natural gas, we believe the federal government should not control the production, gathering, processing or sale of natural gas prior to its entry into an interstate transmission line.

The preceding and the other cabinet recommendations which follow, according to the grapevine, provoked the biggest hassle in the committee and played a large part in delaying issuance of the report nearly 2½ mo beyond the original target date of Dec. 1, 1954. They also provoked the biggest split in Congressional circles, with lawmakers from producing states generally lined up against those from "consuming" states—with some notable exceptions. For example, on March 4, Rep. Carl Hinshaw (R., Calif.) announced that he would offer a bill (H.R. 4675) similar to the bill (H.R. 4560) previously offered by Rep. Oren Harris (D., Ark.) to exempt independent natural-gas producers from federal regulation and also provide that gas produced by interstate pipe line companies or their affiliates be sold at fair field prices.

Representative Harris is ranking majority member of the House Commerce Committee and described his bill as "bi-partisan." He got the endorsement of Speaker Sam Rayburn (D., Texas) as well as that of Representative Hinshaw, who described his own bill as a measure "to protect consumers from unreasonable prices." Sen. Lyndon Johnson, majority leader, earlier reported himself as in favor of the committee recommendations, and Sen. Price Daniel (D., Texas) announced Feb. 26 that he would join with senators from other states in introducing legislation "to effectively eliminate the confusion arising from the Supreme Court's decision in the Phillips case." Support for the gas recommendations also came from Frank M. Porter, president, American Petroleum Institute, and Rep. Charles Halleck (R., Ind.).

First to line up for continuance of federal regulation of gas production on the Senate side were Douglas of Illinois, Dingell of Michigan, and Kefauver of Tennessee, all Democrats, later joined by Wiley (R., Wis.) and Magnusson (D., Wash.) chairman of the Senate Commerce Committee, who announced that he would favor legislation to "protect the interests of the consumer." On March 3, Rep. John W. Heselton (R., Mass.) announced that he would introduce a bill to make it clear that the federal government controls gas production and prices. As an influential member of the House Interstate and Foreign Commerce Committee, it was expected that his bill would become a rallying point for "consumer-state" lawmakers. It was introduced March 15.

Coal Backs Staggers Bill

With hearings on the various bills scheduled to begin March 22 before the House Commerce Committee, headed by Rep. Percy Priest (D., Tenn.), who backed the Harris-Hinshaw bills, the coal industry came out for a bill introduced March 15 by Reps. Harley Staggers (D., W. Va.) and John Saylor (R., Pa.). In announcing the industry stand, Tom Pickett, executive vice president, National Coal Association, noted that the Harris and allied bills were too limited in scope and were a piecemeal rather than a comprehensive approach to the problem of gas distribution and sale. He also announced a series of industry meetings starting March 17 and ending March 23 to explain the Staggers bill and enlist support. The five objectives of the bill are:

1. It would vest jurisdiction in FPC over direct industrial sales of natural gas in interstate commerce, thus making industrial gas bear a fairer share of the cost of distribution and sale, with resulting benefits to small gas consumers.
2. It would strengthen FPC's authority to define clearly the conservation standards for natural gas FPC is expected to administer.
3. It would subject imported natural gas to the same rules as domestic natural gas.
4. It would prohibit sales of natural gas at prices below cost, including cost of transportation and sale, plus a fair proportion of fixed charges.
5. It would establish in law definitive standards to guide FPC in the exercise of its statutory duty to protect the public interest.

Removal of Federal Power Commission jurisdiction over natural-gas producers and gatherers was recommended by Chairman Jerome K. Kuykendall, who appeared as the first witness in the House Commerce Committee hearings March 22 and supported the Harris bill. Meantime, bills similar to the Staggers-Saylor bills had been introduced by nine other House members.

PREDICTION—Exemption of natural-gas production and pricing from federal control is a major plank in coal's platform, since such exemption should reduce competitive pressure by letting prices seek their natural higher levels. Feeling in Congressional circles immediately following the cabinet committee report was that legislation establishing such exemption has a good chance of passage.

The interstate transmission of natural gas by the interstate transmission lines and the subsequent sale of such gas for resale is a public-utility function and should be under the regulation of the Federal Power Commission. In considering the certification of new lines and applications for increased rates based on new or renegotiated purchase contracts, the commission should consider, in order to provide for protection to the consumer, not only the assurance of supply but also whether the contract prices of the natural gas the applicant has contracted to buy are competitively arrived at and represent the reasonable field market price, giving due consideration, in the interest of competition, to the reasonableness and appropriateness of contract provisions as they relate to existing or future market field prices.

The several states and their political subdivisions should continue to provide the public-utility regulations of distributing companies, in accordance with usual utility practice.

Thus, the complete cycle of natural-gas production, transmission and utilization will be appropriately regulated: the production and conservation of natural gas by the state conservation commissions; the interstate transmission of natural gas by the Federal Power Commission; and the distribution by the local public-utility commissions.

2. SALES BELOW COST BY INTERSTATE PIPE-LINE COMPANIES

The basic principle regarding the regulation of natural gas and the use of alternative energy sources should be as far as possible that of free choice by the consumer and free and fair competition among suppliers. This, it

is confidently thought, will provide most effectively for the assurance and flexibility of energy supply, both for economic growth and strong security readiness. But sales either for resale or direct consumption below actual cost plus a fair proportion of fixed charges which drive out competing fuels constitute unfair competition and are inimical to a sound fuels economy.

The committee recommends, therefore, that appropriate action be taken that will prohibit sales by interstate pipe lines either for resale or for direct consumption, which drive out competing fuels because the charges are below actual cost plus a fair proportion of fixed charges.

Dumping at well below cost has been the pipe liners' favorite way of building a market—a way that has cost coal many millions of tons over the year because of complete elimination of any opportunity to compete. If action in line with this section is taken, coal will benefit noticeably and immediately. However, a note of warning. In a hassle over whether sales below cost actually were taking place, coal might be charged with doing the same thing. So it should be prepared.

3. EMINENT DOMAIN FOR NATURAL-GAS STORAGE

The power of eminent domain for the acquistion of surface and mineral rights for the development of underground storage reservoirs should be granted subject to appropriate safeguards to protect the public safety, including the mining industry.

4. CRUDE-OIL IMPORTS AND RESIDUAL FUEL-OIL IMPORTS

An expanding domestic oil industry, plus a healthy oil industry in friendly countries which help supply the United States market, constitute basically important elements in the kind of industrial strength which contributes most to a strong national defense. Other energy industries, especially coal, must also maintain a level of operation which will make possible rapid expansion in output should that become necessary. In this complex picture both domestic production and imports have important parts to play; neither should be sacrificed to the other.

Since World War II importation of crude oil and residual fuel oil into the United States has increased substantially, with the result that today these oils supply a significant part of the U. S. market for fuels.

The committee believes that if the imports of crude and residual oils should exceed significantly the respective proportions that these imports of oils bore to the production of domestic crude oil in 1954, the domestic fuels situation would be so impaired as to endanger the orderly industrial growth which assures the military and civilian supplies and reserves that are necessary to the national defense. There would be an inadequate incentive for exploration and discovery of new sources of supply.

In view of the foregoing, the committee concludes that in the interest of national defense imports should be kept in the balance recommended above. It is highly desirable that this be done by voluntary individual action of those who are importing or those who become importers of crude and residual oil. The committee believes that every effort should be made and will be made to avoid the necessity of governmental intervention.

In contrast to the choosing up on the natural-gas recommendations, there seemed—for the moment at least—to be relatively less opposition to the import restrictions. Senators and Congressmen from oil- and coal-producing states generally endorsed restriction, and were joined by the Independent Petroleum Producers' Association of America, Texas Co., Standard Oil Co., of Indiana, Standard Oil Co. of California, and others. The principal dissenters up to the time this report was completed (March 28) was the National Oil Jobbers' Council and the Committee for National Trade Policy, headed by Charles P. Taft.

Early reaction, in fact, seemed to be more that restrictions should be compulsory rather than voluntary. Representative Ikard and Senator Daniel, of Texas, and General Counsel Russell B. Brown, of the independant producers, for example, were among those declaring that the increase in imports so far in 1955 indicated that voluntary restriction would not work. In this connection, Daniel T. Buckley, representing coal before the Senate Finance Committee hearing testimony on the reciprocal trade extension bill (H.R. 1) noted on March 9 that foreign ownership of certain importing companies was a further complicating factor in voluntary restriction. On top of that, there were objections to the standard suggested by the committee. Representative Saylor, R., Pa., as an example, stated on March 9 that the committee's 'recommendations were too liberal.

10% Quota Proposed

The major test of the possibility of getting import restrictions written into the law may come on the Senate Finance Committee vote on an amendment to H. R. 1 calling for a quota of 10% of domestic demand based on consumption in the previous year. The amendment was introduced by Senator Neely, of West Virginia, with an impressive list of 16 co-sponsors: Allott (R., Colo.); Barrett (R., Wyo.); Beall (R., Md.); Bender (R., Ohio); Bible (D., Nev.); Carlson (R., Kan.); Daniel (D., Texas); Dirksen (R., Ill.); Kilgore (D., W. Va.); McClellan (D., Ark.); Martin (R., Pa.); Murray (D., Mont.); O'Mahoney (D., Wyo.); Schoeppel (R., Kan.); Welker (R., Ohio); and Young (R.. Neb.).

Hearings on the Neely amendment got under way March 9, with General Counsel Otis H. Ellis, of the National Oil Jobbers' Council registering bitter dissent. Proponents appearing March 9, included Mr. Buckley, representing the National Coal Association, Southern Coal Producers' Association, American Coal Sales Association, American Retail Coal Association, Foreign Oil Policy Committee and the Coal Div., American Mining Congress; Frank W. Earnest Jr., Anthracite Institute; and spokesmen for the railroads and three railroad unions. On March 11, Eugene Holman, president, Standard of N. J., and S. A. Swensrud, president, Gulf Oil, opposed legal restrictions and asked for an opportunity to abide by the Cabinet committee recommendations on a voluntary basis. B. L. Majewski, president, Great American Oil Co., urged adoption of the Neely amendment.

A number of oil-state representatives endorsed the amendment March 15, including Senator Daniel, Raymond Garey, Oklahoma governor; W. M. Vaughey, president, Independent Petroleum Producers' Association of America; R. L. Free, Texas Independent Producers' & Royalty Owners' Association; R. M. Wagstaff, West Central Texas Oil & Gas Association; and H. P. Nichols, East Texas

Oil Association. Senators George (D., Ga.) and Smathers (D., Fla.) expressed doubts as to the wisdom of the restrictions, while Senator Carlson (R., Kan.) co-sponsor of the Neely amendment, expressed the opinion that chances for committee approval of some form of restriction "looked good."

On March 16, Senator Watkins (R., Utah) offered an amendment to H. R. 1 which would direct the Tariff Commission to protect oil and other domestic industries from imports which would impair their ability to meet wartime requirements. Meantime, a substantially similar story on the need for restrictions was being unfolded before a Senate Labor subcommittee inquiring into unemployment in coal.

In addition to opposition voiced before the Senate Finance Committee, the Conference of New England Governors, on March 15, adopted a resolution voicing "strenuous opposition" to the Neely amendment on the ground that it would add "million and millions of dollars" to oil and gasoline costs and "threaten the welfare" of all New England motorists, home owners and plant operators. This also was the line in a letter campaign in the East and elsewhere by oil jobbers and retailers to customers, urging them to write their senators. The Maritime Association of the Port of New York joined the opposition March 19, stating that restriction would adversely affect the supply of oil for maritime use.

PREDICTION—Some oil companies have already started to reduce imports, and it is likely that others will attempt to follow—though not all. The difficulties of achieving voluntary reduction on an effective basis are considerable, and this along with the substantial support for import restriction in legislative and public quarters, indicates a good chance for eventual, if not immediate, passage of legislation regulating imports.

The committee recommends, however, that if in the future the imports of crude oil and residual fuel oils exceed significantly the respective proportions that such imported oils bore to domestic production of crude oil in 1954, appropriate action should be taken.

As previously noted, there is substantial sentiment for making this general recommendation specific, and without delay; hence, pressure for legislative action now.

The committee recommends further that the desirable proportionate relationships between imports and domestic production be reviewed from time to time in the light of industrial expansion and changing economic and national defense requirements.

In arriving at these conclusions and recommendations, the committee has taken into consideration the importance to the economies of friendly countries of their oil exports to the United States, as well as the importance to the United States of the accessibility of foreign oil suppliers both in peace and war.

5. PETROLEUM REFINING CAPACITY

The Departments of Defense and the Interior should have studies made by their staffs and expert advisors as to the adequacy of present and prospective refinery capacity, both as to amount and dispersal, as well as other factors, to determine the need for measures to maintain refinery capacity necessary for defense purposes, particulary the capacity operated by small, independent refineries.

6. TAX INCENTIVES

A. Present tax provisions on coal, oil and gas production have been an important factor in encouraging development of energy sources at a pace about in keeping with demand. Further analysis and study by the appropriate branches of the government should from time to time be made to review the amount and method of making such allowances to maintain proper relationships with continuing changes in other features of the tax law. Any changes which may be proposed in the future must be analyzed in terms of their probable effect on development of domestic resources needed for economic progress and national defense, as well as the fiscal and tax policies of the government.

On the gobbledygook side, but perhaps lending some encouragement to coal's contention that it still is being discriminated against in depletion and other allowances.

B. Retroactive tax legislation and special relief provisions should be avoided.

C. Accelerated amortization should be used only to insure the maintenance of a sound mobilization base for energy suppliers.

7. RESEARCH AND DEVELOPMENT PROGRAM FOR COAL

We recognize that coal is a great national asset and endorse a cooperative study to determine what research and development could be undertaken. The coal industry and both federal and state governments should participate in this study and its cost.

8. UNEMPLOYMENT AND BUSINESS DISTRESS IN THE COAL INDUSTRY

We recognize that serious unemployment and business distress exists in the coal industry and recommend that the Interdepartmental Committee on the Soft Coal Industry be continued for the purpose of developing for cabinet consideration specific action programs to alleviate these conditions.

9. COAL FREIGHT RATES

In order to maintain coal's vitality as an instrument of national defense by improving currently its ability to compete with other fuels, the railroads, by voluntary action, and, in the absence thereof, the Interstate Commerce Commission, by compulsory order, should adjust freight rates to the extent necessary to remove the excessive and disproportionate contribution that coal rates are making to meet the cost of other unprofitable services of the railroad industry. Trainload rates should be established to reflect the lower costs of such service.

Reasonable freight rates have long been one of coal's major requests, and the committee could hardly have been more definite in supporting the industry's viewpoint. The majority of the railroad thinking, however, seems to be directly opposite to committee recommendations. For example, the Traffic Executive Association, Eastern Railroads, told the Cabinet committee, in effect, that "coal had not lost a ton of business" because of higher freight rates. Also, the Eastern, Midwestern and Western railroads called a hearing in Chicago, March 10, to prepare the record for a request to the ICC for authority to cancel rate reductions on certain fine coals and to limit refunds on speci-

fic Lake-coal movements. The fine-coal reductions in question range up to 35c per ton.

A one-day hearing had been scheduled, but when 250 representatives of producers, shippers and consumers showed, the latter including some of America's blue chip concerns, the hearings were extended or rescheduled. The opposition was led by the Committee on Interstate and Foreign Commerce of the National Coal Association, and was perhaps the most vigorous in coal industry history.

On March 23, NCA followed up with an application to the ICC for removal of the bituminous rate increases authorized in 1953 and earlier in Ex Parte 175. The increases range up to 40c per ton, and average about 33c. "Only by a downward adjustment of rail freight rates on bituminous coal can the trend of the decline be erased and recovery of lost tonnage be expected," declared NCA in its brief supporting the application.

PREDICTION—With the railroads taking the stand that they do, and in view of past ICC reluctance to accept coal's story, the prospects for much relief are chancy, though perhaps better than they were before the cabinet report was issued. But with the report, perhaps coal can stop further increases and then go on to general adjustments in the future. Continued pressure, however, will be necessary.

10. COAL EXPORTS

A. The government should urge foreign governments to reduce unreasonable discriminatory restrictions against imports of U. S. coal.

B. The government, when making foreign loans, should use its best efforts to obtain provisions to prevent discrimination against U. S. coal. Discrimination should be judged to exist when U. S. coal imports are disallowed despite availability at costs no higher than foreign coal.

C. The government should expedite efforts to establish credits through the Export-Import Bank to foreign banking institutions in countries where there is reasonable prospect of repayment so that American coal exporters can offer more competitive payment terms to foreign customers.

D. Where U. S. coal can be supplied competitively with other available coal, the government should use its best efforts to enlarge the participation of U. S. coal in the foreign-aid program.

E. The government should compensate for higher shipping costs when incurred as a result of the requirement that 50% of all shipments be made in U. S. ships at fair and reasonable U. S. market rates.

These recommendations probably will not sit well with the rather vocal group, within government and without, that contends that the United States should import and pay but not export except free and only on request. Unfortunately, that group has considerable influence directly and indirectly, but the blueprint laid down by the committee is clear and if the government departments and agencies concerned follow it, even if only in part, coal should come closer to a fair shake in foreign business.

11. MOBILIZATION REQUIREMENTS FOR COKE

The committee believes that the present and prospective rates of shutdown and dismantling of slot-type coke ovens will leave inadequate coking capacity to support full mobilization production of steel and other essential wartime industry.

On the basis of national security, coke requirements can only be met if the Office of Defense Mobilization is directed to prepare plans to make the necessary arrangements and tests to expand coke production rapidly in the case of an emergency.

12. GOVERNMENT FUEL PURCHASING POLICY

In working out a more consistent and equitable coal purchase policy, the following steps should be taken:

A. The Secretary of Labor, under the Walsh-Healy Act, should pursue his present policy of making determinations of wage standards applicable in the coal-producing areas, and should establish these standards at the earliest practicable date.

B. The government agencies should, to the extent practicable, purchase not less than 75% of their estimated annual coal requirements on a contract basis.

C. All government agencies purchasing coal should, prior to and after the award of the contract, verify the quality of the coal offered and supplied to the agencies.

D. All government contracts for the purchase of coal should contain appropriate escalator clauses which protect the buyer and the seller.

E. In instances where it is not possible for a government agency to take all the coal for which it has contracted, the deficit should be apportioned equitably among all the participating contract suppliers without penalty to the government.

F. Coal suppliers should be required to submit, along with their bids, proof of their ability to produce the requirements at the time specified.

G. All coal suppliers to the government, regardless of size, should comply with the Federal Coal Mine Safety Act.

H. All transactions with the government relating to coal purchases and supply should be public information.

I. The domestic fuel purchasing policies set forth above should be applied to purchases of coal by companies acting as agents for the federal government, as well as to purchases made direct by government agencies.

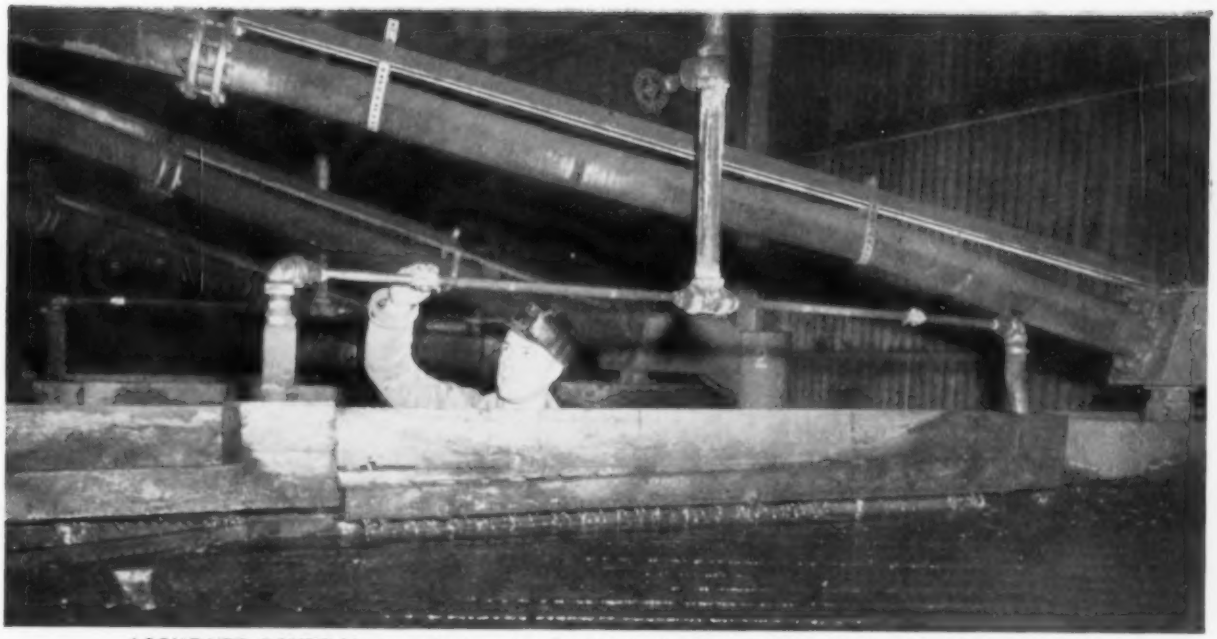
Prior to the purchase of any fuel by a federal-government agency having a large annual use of fuel, that agency should request advice from the Office of Defense Mobilization as to how this purchase can contribute to the maintenance of a strong mobilization base within the domestic fuels industry. The Office of Defense Mobilization should be directed by Executive Order to develop a mechanism for accomplishing this objective.

BLUEPRINT FOR ACTION—Coal stands to benefit from this report and its recommendations for these reasons:

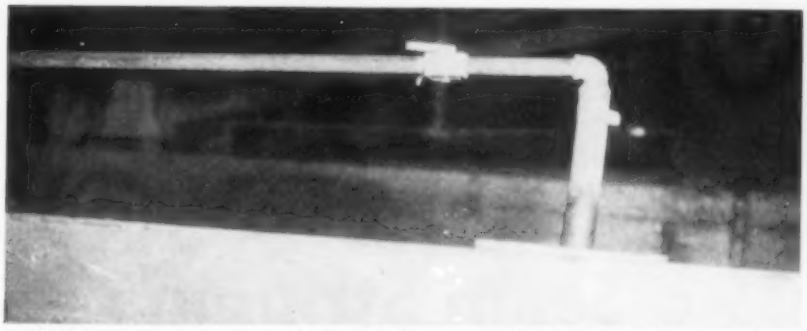
1. The major elements in coal's program for eliminating discrimination and assuring fair access to all markets have been accepted by a group of government officials second only to the President in policy-making authority.

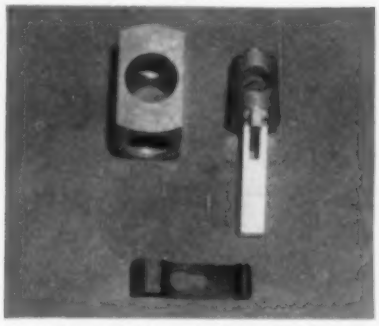
2. Cabinet-level conclusions—requested by the President and released by the White House—are bound to command respect and action.

Coal is now moving, with its allies and also, strangely enough, at least some of its competitors, to see that as many of the committee's recommendations as possible are put into effect. The chances are better than fair for success in most important categories. The result will be a better climate for building business through low cost, quality and service.



ACCURATE CONTROL over feed water flowing to table is achieved with take-down valves.





COMPACT take-down valve (left photo) speeds cleaning of foreign particles from feed-water line at Hanna's Georgetown plant. Components of valve include outer member (top left), inner member (top right) and clamp.

Easily Cleaned Valves Control Table Water

MORE PRECISE CONTROL of dressing water flowing to fine-coal washing tables, and easy removal of foreign particles that back up behind valves, are top benefits resulting from installation of take-down valves at the Georgetown preparation plant of the Hanna Coal Co., Cadiz, Ohio.

Keeping water flowing accurately to each of the 30 tables in the plant is a big job. And when foreign particles in the dressing water back up behind a gate valve controlling flow to a portion of the table, table performance is not up to standard. To remove the backed-up material, the table had to be taken out of service and the feed directed to one of the spare tables. Then the pipe line and valve had to be removed, cleaned and reassembled. This method was used until the take-down-type valves were installed on all lines and tables. The new units were obtained from Time Savers for Industry, Clinton, Ohio, which installed one valve experimentally about 4 mo ago. Hanna's preparation men liked the new take-down valve so well that 60 have been put in service in the feed-water lines.

Flow through the knock-down valve can be regulated accurately and easily by observing the position of the valve handle which lies flat on top of the valve. The optimum position for the handle which would release the right quantity of water was determined while the experimental unit was undergoing tests, and when the valves were installed on all lines they were adjusted similarly. Having a way to check visually on the flow through the lines reassures plant operators, whereas a gate valve had to be closed and re-opened to determine how wide it was open.

If foreign particles back up behind the knock-down unit, they can be removed much more quickly than if a gate valve were used. Water flow to the table is cut off and the valve is knocked down in place rather than by disassembling the pipe line and the valve. The job is done quickly by sliding the thin metal holding piece until the inner member of the valve is released. The inner section is lifted from the housing, leaving a hole through which a small tool or wire may be inserted to loosen the foreign material. The entire operation of taking the valve apart, removing the foreign material and reassembling the valve can be done in a very short time.

TWO-SEAM STRIPPING at Saxton Coal's Newcastle mine is carried out by draglines that handle overburden in 45-ft cuts.

Flexible Two-Seam Stripping

Two draglines, horizontal and vertical overburden drills, and diesel-powered coal shovel work together for smooth, efficient production at Illinois mine.

COORDINATING activities of two stripping units while recovering coal from two different seams is a job that calls for teamwork. It is especially true when the coal is thin and working areas are somewhat restricted. But these conditions pose no insurmountable problems to the management of Saxton Coal's Newcastle mine, near Carrier Mills, Ill. Saxton is mining from the Illinois Nos. 2 and 3 seams for the Sterling-Midland Coal Co., stripping two shifts and loading coal one shift. The bulk of the tonnage is shipped to the TVA via the N. Y. C. R.R. to Joppa, Ill.

DEVELOPING THE MINE

Shortly after the Sterling-Midland Coal Co. was awarded a contract to supply coal to TVA, Saxton entered into an agreement with it to strip mine coal from the smaller tracts that the Stonefort Corp., a Sterling Midland affiliate, could not recover economically with their large-capacity equipment (*Coal Age*, August, 1954, p 64).

Saxton's equipment was moved to Illinois in July, 1953, from Jellico, Tenn. Erection of stripping units and service buildings required one month and overburden removal began in August, 1953.

UNCOVERING THE COAL

Overburden over the No. 3 coal consists of earth and shales ranging from about 10 ft in thickness at the outcrop to 30 ft at the tops of gently rolling hills. The No. 3 coal is 38 in thick and has a thin parting of hard shale in the middle. The 20-ft interval between the two seams consists of 10 ft of shale overlying the No. 2 coal and 10 ft of sandstone. There are no partings in the lower seam, which is 40 to 42 in thick. Both coals are

KEY MAN at Newcastle mine is John Wible, superintendent and veteran strip miner.

TRUCK-MOUNTED rotary dry-type drill sinks 5⅝-in vertical blastholes to the No. 2 coal.

COMPANY-DESIGNED self-propelled horizontal drill bores 5⅝-in holes 55 ft deep in the No. 3 overburden.

SHOOTING CREW charges horizontal blastholes with cartridges of 80% dynamite, fires holes in groups of 10 to 20.

FLEXIBILITY is achieved with crawler-mounted diesel draglines. This 7-cu yd unit usually uncovers the No. 2 coal.

harder than other coals in the field and are higher in quality than most others in the area.

A 621S Page diesel dragline, equipped with a heavy-duty Hendrix bucket, made the initial 60-ft cut on the No. 2 outcrop. No blasting was required to prepare the first-cut material for digging. After the coal is removed from the initial cut, stripping continued in 60-ft swaths until the No. 3 outcrop is reached. A Lima 2400, equipped with a 7-cu yd heavy-duty Hendrix bucket, now handles the overburden removal job on the No. 2 coal and the Page unit uncovers the No. 3 seam.

The first cut in opening the No. 3 seam also was 60 ft wide and no blasting was required. After the coal was loaded from this cut, a 45-ft strip was removed from the No. 2 coal, leaving a 15-ft berm for a haulage road on the No. 3 level. All succeeding cuts on both seams are 45 ft.

After the initial No. 2-seam cut, overburden had to be blasted. For blasthole drilling of all succeeding cuts until the No. 3 outcrop is reached a company-built self-propelled rubber-mounted sidewall drill is used. Holes are drilled 55 ft deep on 18-ft centers about 2 ft above the top of the coal. They are charged with 30% dynamite and fired in groups of 10 to 20. A two-man crew operates the drill, boring an average of 14 to 16 holes per shift.

Essential parts of the company-designed drill include a Mercury V8 engine and transmission; a hydraulic feed cylinder connected to a hydraulic system powered by the engine; a ratchet-jack leveling device; hydraulic brakes; steering mechanism; auger guide for supporting the first 6-ft section of auger as it starts the hole; and a short removable drive shaft that connects the transmission to the differential when the drill is to be trammed.

When stripping is carried out simultaneously in both seams, the horizontal drill is used to bore holes over the No. 3 coal and a Reich Bros. truck-mounted vertical unit is used to drill the cover on the No. 2 seam.

SECOND STRIPPER is 7½-cu yd dragline that normally uncovers the No. 3 coal. Working assignments are varied.

COAL LOADING on day shift is speeded by heaping the thin seams in a pile along the highwall on the second shift.

COMPACT crushing, sizing and loading facilities for processing coal for Saxton's customers are housed in this plant.

SELF-CLEANING platform spans bin at the tipple, permitting end-dump trucks to unload in center of bin.

Vertical holes are drilled on 18-ft centers along the highwall and with rows on 15-ft centers. The vertical drill is equipped with a 20-ft drill stem that permits a hole to be drilled without stopping to add rods. The drill stem is fitted with either Hughes Tricone, Gruner Dakota or Frio oil-well-type rotary bits. Drilling speed is approximately 1 ft per minute and one man operates the unit while sinking an average of 400 ft of hole per 6¾-hr shift.

Drill cuttings are removed by compressed air supplied by a 210-cfm Schramm air compressor, supplemented by an Indiana blower that handles the finer material. Drill rotation and feed are controlled hydraulically from a hydraulic system powered from the International R-190 truck motor.

LOADING THE COAL

A Northwest Model 6 diesel shovel equipped with a 2¾-cu yd dipper alternates between the two seams in loading coal. Prior to loading, the coal is cleaned by a Hough HRS Payloader unit. To speed loading on the first shift, the shovel is operated on the second shift to pile one half of the uncovered coal on top of the other portion. The shovel advances along the spoil bank and casts the coal toward the highwall where it can be loaded rapidly the following day.

A fleet of five KR8 International 12-ton dump trucks carry the coal about 1 mi to the Saxton sizing and loading plant. A company-designed self-cleaning unloading roadway spans the storage bin at the tipple and permits the dump trucks to unload directly over the center of the bin instead of backing to the edge as with a normal setup. This type of unloading speeds the haulage cycle and permits complete filling of the bin.

Preparation facilities include a crusher for reducing R-O-M coal to 4x0 and a vibrator for making stoker-size when desired. The tipple operator also controls an electric traffic light that directs trucks as they approach the highway crossing near the plant.

This special drill *r.g.* designed by Anthony Schacikoski, General Superintendent of Leechburg's mining operations, makes drilling easier — takes full advantage of Kennametal roof bits and the Jeffrey drill.

Kennametal* HFD roof bits last longer than other carbide bits at Leechburg Mining Company

At Leechburg Mining Company's Park Mine, tests were made of Kennametal HFD 1⅜-inch roof bits and other carbide bits of the same diameter. Using a Jeffrey A-7 Drill with shop-made rods and drilling rig, holes two feet deep were drilled into hard, brittle slate having a one-inch pebble streak.

Four holes were drilled with the other carbide bits under test before reconditioning was necessary. Under the same conditions, 14 holes were drilled with Kennametal before resharpening, reducing bit cost to ⅓ of what it was formerly.

Kennametal bits last longer because they're made better. They have shock and wear-resistance qualities superior to any other tungsten-carbide bits in the industry. Try them. Your bit costs will be less. You'll spend less time resharpening and changing. You'll drill more holes per man, per machine, per hour. Your Kennametal representative, a veteran having many years of mining experience, will help you put the right tool on the job. Call him, or write: KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

National Mine Service Company

National Mine Service appointed Kennametal dealer

Complete stocks of Kennametal mining tools are now available at all National Mine Service warehouses . . . Indiana and Forty-Fort, Pa., Beckley and Logan, W.Va., Jenkins and Madisonville, Ky. Kennametal service and sales personnel work with those of National Mine Service in giving tool performance demonstrations and reconditioning instructions and to help you in tool selection.

A third less manpower A third more drilling

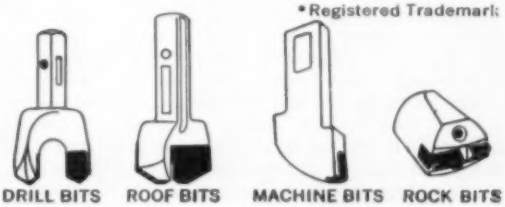
Use of the Kennametal RD 1⅝-inch bit resulted in both easier drilling and lower drilling cost in an anthracite measure at Rogers Bros. Co., Scranton, Pa. Simply by changing to this bit, two men are now drilling ⅓ more each shift than previously drilled by three men in the same length of time.

New—Uranium prospector's drill

Kennametal recently introduced a carbide-tipped hand drill for uranium prospectors. This new tool stays sharp much longer than conventional drills, greatly reducing the load of drills to be carried into remote prospecting areas.

*Registered Trademark

INDUSTRY AND **KENNAMETAL** *. . . Partners in Progress*



DRILL BITS ROOF BITS MACHINE BITS ROCK BITS

FOREMEN'S FORUM

THE TOOLS a modern coal miner needs to do his job may require an investment of $10,000 or more in hard cash.

Our system of doing business is a good one. Improve it, we can; support it, we must. Economic teamwork results in benefits for all concerned.

Supporting Your Company's Aims

YOU HAVE OFTEN HEARD this department stress the point that you must be in complete agreement with your company's policies if you would be most effective as a supervisor. Now we would like to expand somewhat upon that theme.

It is conceivable that when a noisy critic of our system of doing business sounds off, his glib criticisms may be difficult to refute. On or off the job, though, you can ill afford to let such misconceptions go unchallenged. You should be equipped to enter a calm word in defense of a way of life that offers so much to so many.

That is the lofty philosophy. Now, let's get down to cases, and perhaps the best way to do that is to seek answers to these questions:

What is our system of doing business?

How does my company fit into that system?

Who benefits from my company's operations?

Perhaps we can demonstrate some abiding reasons for living and working under this system of ours. And we may find answers to educate the misinformed who would have us scrap the whole system every time a flaw is detected.

Well, what is our system of doing business? It sets up now in a structure similar to that of our government, including checks and balances designed to prevent an unfair distribution of the benefits of doing business as our three-department form of government is designed to prevent excesses of power.

The system prescribes that the individual must have the greatest possible degree of freedom in pursuing his own happiness. Individuals sometimes have concluded that they do a better job of pursuing happiness by pooling their talents. They form partnerships. Perhaps then they decide they might make even greater progress if they had enough cash to permit them to take advantage of an existing opportunity. To accumulate that cash they sell a portion of their most valuable asset, their business, to anyone interested in buying a share of the enterprise. Thus a corporation is born.

In barest essentials, that is our system of doing business. Some folks choose to take jobs with firms already in business. Others decide they prefer to pursue their happiness in other ways. Others lack the courage or knowledge to make the leap into business ownership, but the opportunity still is there for all.

Completing the picture of our business system are the eternal fly-by-nighters, corner-cutters and parasites of all types who serve to remind us that the kingdom of heaven is not yet here and that our system still is amenable to improvement. That's improvement, not replacement.

How does your company fit into the system of doing business? What is your company's role in the scheme of things?

Your company did not just happen. In its earliest beginnings it represented the fond hopes of one man or a small group of associates. If we imagine ourselves in their position, we see immediately that one must have some reason for launching a business, and this reason is the foundation of all company policy.

In your company's case, the basic reason, or policy, may boil down into some statement like this:

We choose to engage in the business of producing and selling coal. We feel certain we can produce coal that will find favor in the market. If we are correct, the result will be profit for us in proportion, we hope, to the risk we take and the service we render. There also will be employment for those who wish to sell their services to us, and an outlet for those other companies who make and sell the supplies we can use in our business. The transportation industry will benefit in moving our bulk product to our customers. Thus we hope to grow.

Let's not blink one fact here. The profit motive is a big one, but there is no need to apologize for it. You are not a greedy person, are you? Neither am I. Yet I would like to be in business for myself in order to (1) make a whopping profit and (2) render the type of service that would insure continuation of that

TOPS IN TEAM WORK—ALL THREE

each does a special job

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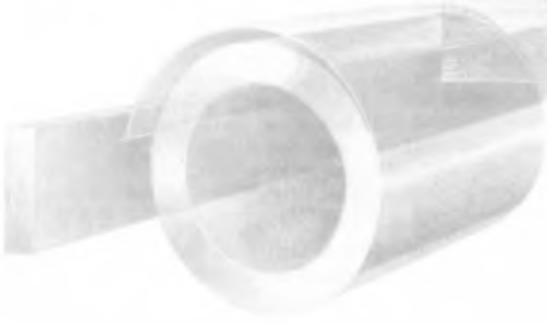
JALTEN NO. 2—High strength, moderate forming—improved resistance to atmospheric corrosion.

JALTEN NO. 3—High strength—improved abrasion resistance.



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profit. The fact is, however, that profits are not so whopping, and those who bemoan the "high profits" of the business community usually speak in complete unawareness of the extremely thin slice of the sales dollar which finally shows up as profit.

Let's get back now to the main theme. We have defined the basic policy of your company. The policy makes us aware of the fact that the interests of a number of participants are bound up in this company, as follows:

- **The public** has a right to expect highest-quality products for the money it spends for those products. The public also may rightfully expect the company to conduct itself as a good neighbor in all civic contacts.
- **Stockholders** are not unreasonable in expecting the company to pay something for the use of their money.
- **Management** should be adequately compensated for its efforts in planning the company's growth and directing its resources toward profitable ends.
- **Employees** may rightfully expect the highest possible wages, all factors considered.
- **The government** has an interest, since most of its funds are drawn from the business community, which includes your company.

That adds up to a large and varied group of vested interests in your company. The company has obligations to each interest, but the company cannot speak or act for itself in fulfilling those obligations. Someone must speak or act for it. Who is that someone? Well, it should not be top management alone. It should involve everyone who has an interest in the company's health. This includes everyone in the foregoing list of participants, but you may have to carry the message alone for a time in your daily work contacts.

You might arm yourself with facts concerning the benefits each of the participants receives as a result of all working together. Let's look into that.

How the public benefits . . .

Your local neighbors benefit from the operations of your company in a most direct manner. Local business is stimulated. Professional people, like doctors, lawyers and clergymen, find an outlet for their services among those who work for the company. The building trades flourish. Others find a livelihood in providing recreational facilities for all these people. And so on. A picture like this is especially true in the coal industry, where so many communities draw their economic well-being from a single mine or company.

In a larger sphere, your company is becoming more and more active in citizenship through its good housekeeping in the interest of civic pride, its efforts to conserve the value of clean streams and air, its support of local educational facilities, and perhaps its scholarship program for the higher education of worthy young people. All these are benefits accruing to the public as a direct result of your company's activities.

Spring Planting

THIS TIMELY ADVICE, by J. W. Cummings, Grant Town, W. Va., is reprinted from a recent issue of the Safe Mine Foreman, a publication of the Accident Prevention Dept., Coal Div., Eastern Gas & Fuel Associates, Mount Hope, W. Va.

First plant four rows of peas:
Presence.
Promptness.
Preparation.
Perseverance.

Next plant three rows of squash:
Squash gossip.
Squash criticism.
Squash indifference.

Then plant five rows of lettuce:
Let us be faithful to duty.
Let us be unselfish and loyal.
Let us be true to our obligations.
Let us obey rules and regulations.
Let us love one another.

And no garden is complete without turnips:

Turn up for work.

Turn up with ambition to get things done.

Turn up with determination to make everything count for something good and worthwhile.

What the stockholders should get . . .

The all-too-common picture of a stockholder as a silk-hatted High Mogul is as old-fashioned as the '03 Oldsmobile. Most of our larger companies are owned by thousands of the kind of people we like to know. We respect them because they live reasonably, they love their children and their pets, and they have acquired the noble habit of thrift. Having the freedom of choice open to all Americans, they have chosen to lend a portion of their earnings or their inheritance to your company to be used for growth and progress. They could, if they wished, spend the money for things and fun, or they could stuff it away in dynamite boxes in the cellar.

But they choose to have your company put their money to use in the hope that a profit will be made in which they can share. There's nothing unreasonable in that. Takes a confident individual to back up hopes with hard cash.

What a stockholder's share of the profits should be is a matter of argument, as you well know. However, few people who purchase stocks make the fast killing some other folks think they do. We have been surprised and pleased to learn of the number of large companies in which the leading stockholder owns less than 1% of the shares and the remaining 99% are distributed among thousands of others. And concerning the staggering profits you sometimes hear about—well, if the average investor realizes $6 per year for each $100 he has invested, he considers himself very fortunate.

Management's value to the business . . .

Some fellows are willing to work themselves down to a nub to get ahead and make more money. We figure that after a life like that a man is worth all the money he can honestly accumulate. Other men have superior abilities which cannot be denied and they make contributions to the company which cannot be underestimated. We can see no alternative to paying them in proportion to their true worth—and that may be pretty high. Still others of us are destined to take it easier, move slower, end up lower—and we should be thankful for the resulting small favors.

In any event, if the annual compensation of all top executives in your company was pooled and distributed equally among all other employees of the company, the resulting increase would barely cover the annual cost of a fellow's Copenhagen snuff.

Surely, management and engineering skills, which mean so much to corporate health, are worth that much.

The employee's share . . .

Don't argue wage scales in the mine. You and the crew are on the same team, trying to work a good shift, tonnagewise. But you would not be remiss in reminding that real compensation consists of a number of things. It includes, among other things, the free use of the expensive tools which make possible the jobs in modern coal mines. The tools are bought from the funds which the stockholders have entrusted to your company's management. The cost of the tools for each man in a modern mine may amount to $10,000 and up, if we include the mechanized face equipment and cleaning facilities which are so necessary in most mining areas today.

The government's stake . . .

The government benefits . . . and how! The proceeds from the sale of the coal go into a big kitty, say. The bills for wages, supplies and other costs of operation are paid first, then the government takes a healthy cut which helps support our defense establishment, provide typical government services, render economic aid to other nations and so on. There are other "governments," too, and each is financed by funds which come in large measure from company's like yours. Your local police force, schools, perhaps the town water-supply and sanitary facilities, township roads, county institutions, state highways and so on are financed in part through the activities of this enterprise known as your company.

That's the burden of our message for this month.

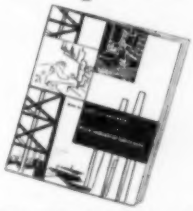
The windup is this:

Know your company. Support its aims. Set the record straight when you hear a "crosscut economist" mouthing a lot of misconceptions. Our system of governing ourselves and transacting our business permits dignified living for millions of people, and of course we stand ready to improve it where the need for improvement is clearly shown.

Cut costs with Pure's "Simplify and Save" plan

Pure Oil research has developed a special line of multi-purpose lubricants for industry. Why *multi-purpose* lubricants? It's this simple: the fewer the lubricants, the lower your inventory . . . the less chance for error in application (and resulting "down time") . . . and the fewer the man-hours needed for ordering, stocking and application.

Experience proves that, in the average plant, a maximum of six Pure Multi-Purpose lubricants is all you need. Let Pure Oil's industrial engineers show you how to streamline *your* lubrication program. Reverse the charges to your nearest Pure Oil office. Call now.



FREE BOOKLET tells you "How to Simplify and Save." Write The Pure Oil Company, 35 E. Wacker Drive, Chicago 1, Illinois. (Offer limited to Pure Oil's 24-state marketing area.)

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COAL AGE

OPERATING IDEAS

Here's One Way to Cut Time In Changing Shovel Ropes

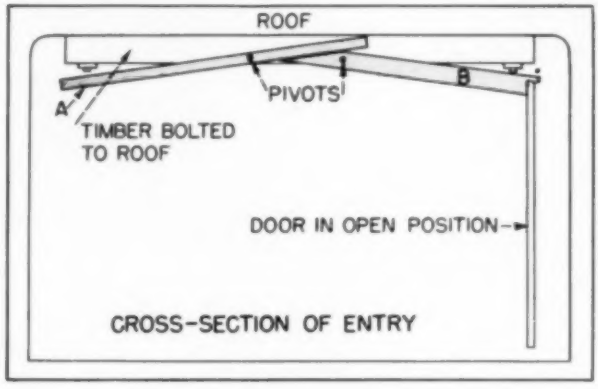
BREAKAGE OF A SHOVEL CABLE need not cause lengthy delays in operations. You can save at least the hour it takes to get word back to the warehouse and delivery of the rope. As shown, five spare ropes cut to exact length are hung on the shovel. The spares include two trip cables, one hoist cable, one crowd cable and one rehaul cable. The time lost as a result of rope breakage now is limited to that required to take out the remains of the old rope and clip on one of these spares.

Lever-Action Door Closers Improve Shuttle-Car Haulage

AIR-LOCK DOORS on shuttle-car runways can be closed by the operators without stopping their cars, writes C. Frederick Eben, mining engineer, Crucible mine, Crucible Steel Co. of America, Crucible, Pa., if the levers shown in the illustration are installed. Hitting up on *A*, as the car passes through, also raises *B* to release the door so that it swings closed.

When the other car comes out, the door is bumped open and is held open by *B*. When a right-hand-drive car trams inby, the operator pushes up on *B* to release the door.

A and *B* are easily fabricated out of brattice board, and the pivots are made of heavy spikes or screws.



Tool-Grinding Tip From Pottery Plant!

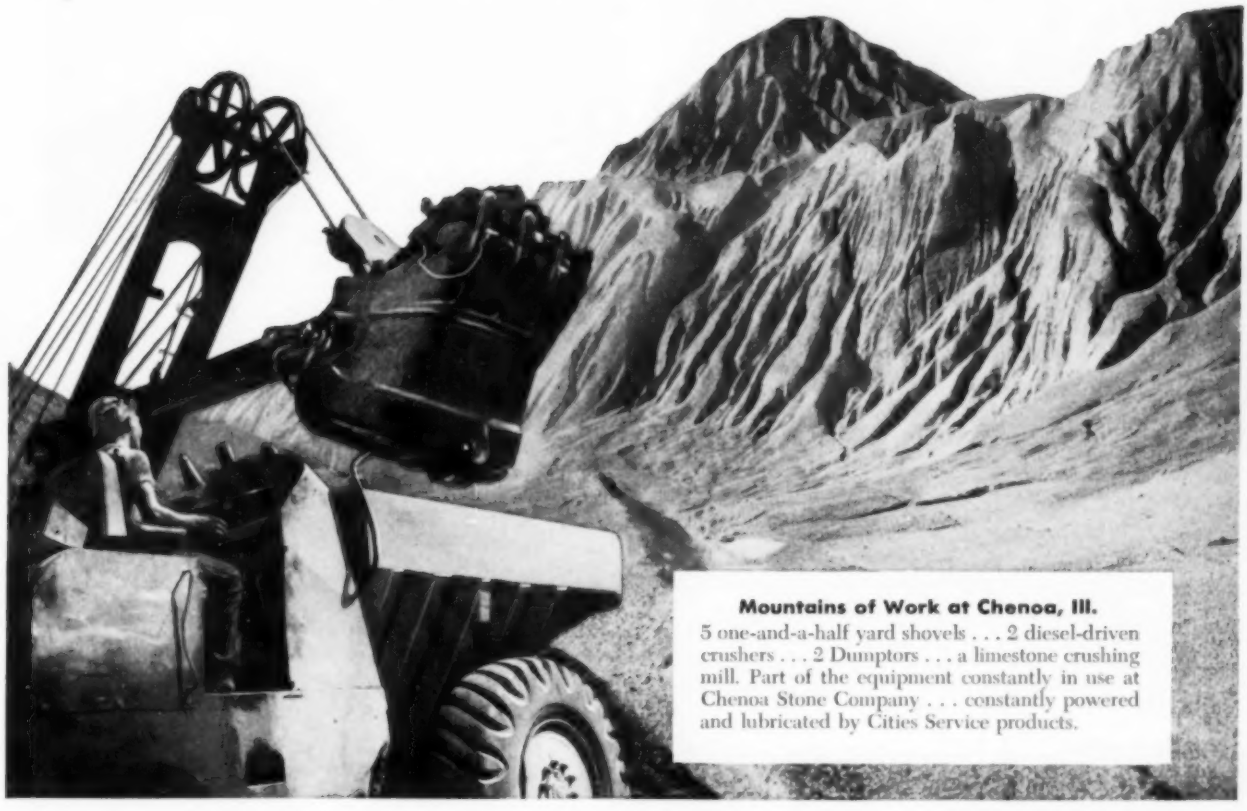
WHEN THIS TOOL-MAINTENANCE MAN at Scio Pottery, Scio, Ohio, found the steady-rest of his grinder wearing away—giving him a hard time in reproducing proper grinds on carbide chipping and finishing tools—he fought carbide with carbide. He solved his problem by brazing a Carboloy 883 tool blank to the steady-rest to provide resistance against wear. It works fine.

More Contributors . . .

THERE ARE several reasons why COAL AGE publishes more material written by coal mining men than any other magazine. For one thing, mining men with something to say or an interesting development to report know that publication in COAL AGE will get the attention of thousands of mining executives and officials throughout the country. Then, too, they've also learned from experience that COAL AGE welcomes their contributions, whether they're major articles or operating shorts, factual reports or statements of opinion, as long as they are of interest to our readers and contribute to the industry's progress. If you have something you think is worth publishing, write: The Editor, COAL AGE, 330 W. 42 St., New York 36, N. Y.

Cities Service C-300 cuts make-up oil 600%!

Stone cold facts from the
Chenoa Stone Company, Chenoa, Illinois



Mountains of Work at Chenoa, Ill.
5 one-and-a-half yard shovels . . . 2 diesel-driven crushers . . . 2 Dumptors . . . a limestone crushing mill. Part of the equipment constantly in use at Chenoa Stone Company . . . constantly powered and lubricated by Cities Service products.

Here's the story in the words of David D. Vickrey, Superintendent of Chenoa Stone Company:

"About two years ago, we switched from another nationally prominent brand oil to Cities Service C-300 Series Motor Oil. The results have been amazing.

"C-300's detergent action completely eliminated a bothersome sludge problem. On our first three oil changes with it, we removed 5 gallons of sludge from each of our 200 horsepower diesels. Since then, these diesels have remained clean, and today, when we open the crankcase, we can even see the paint.

"We also are using far less oil between changes. In fact Cities Service C-300 actually cut make-up oil from 5 to 6 gallons every 150 hours to less than one gallon every 150 hours!

"In addition to C-300 oil, we use Cities Service Lubricants for every requirement... Diesel Fuel, Gasolenes, Trojan M Grease and hydraulic fluid. We have been completely satisfied with every product.

"Cities Service has given us top-notch service, the best we've ever had. We are better supplied than ever and have learned to rely on Cities Service dependability."

There is nothing Cities Service could possibly add to Mr. Vickrey's statement, except a reminder to contact your local Cities Service representative in order that you may enjoy similar results in *your* operation. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

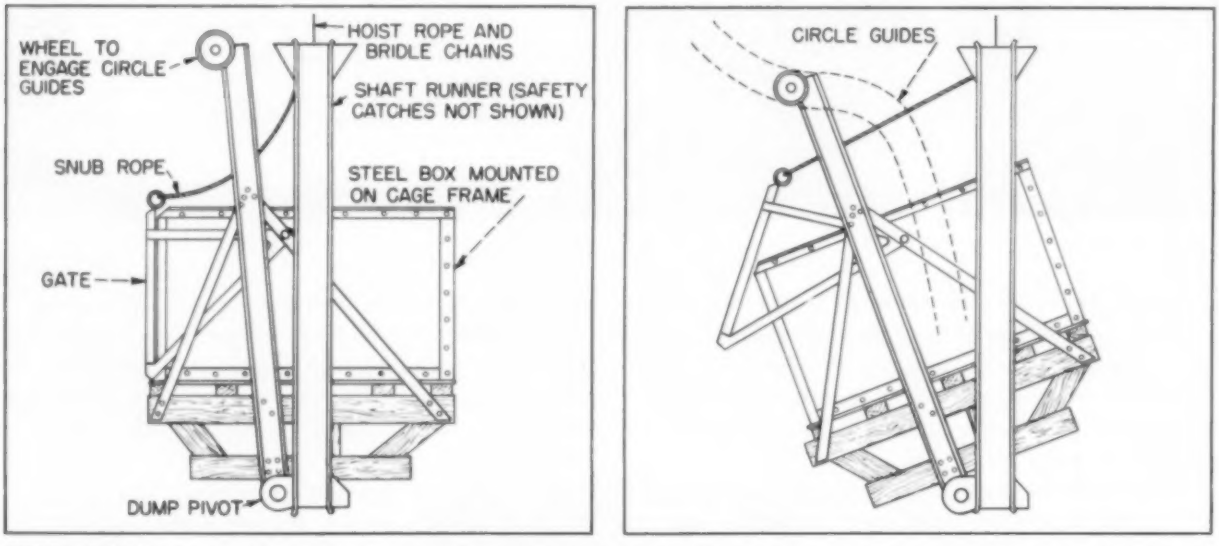
QUALITY PETROLEUM PRODUCTS

HOW AN UP-AND-DOWN LEVER steers the drill.

LEVER DROPPED OUT OF THE WAY for drilling.

How Redesigned Steering System Improves Highwall Drill

NOW IT IS POSSIBLE to position this drill closer to the highwall without having a man at the front end—exposed to the hazard of being squeezed against the highwall—to steer it into position. The dual-wheel front caster has been replaced by a front axle from a Dodge pick-up truck, and steering is done by up-and-down movement of a lever which extends back along the side of the drill. The lever is disconnected at the fulcrum pin and dropped to the ground during drilling to clear the way for the man changing auger sections (see photograph at right above).



STEEL BOXES with endgates lifted by snub ropes and the tilting action of platforms convert cages into skips. Circle guides engaging rollers provide dumping action, as shown at right.

Converting Cages Into Skips Permits Larger Mine Cars

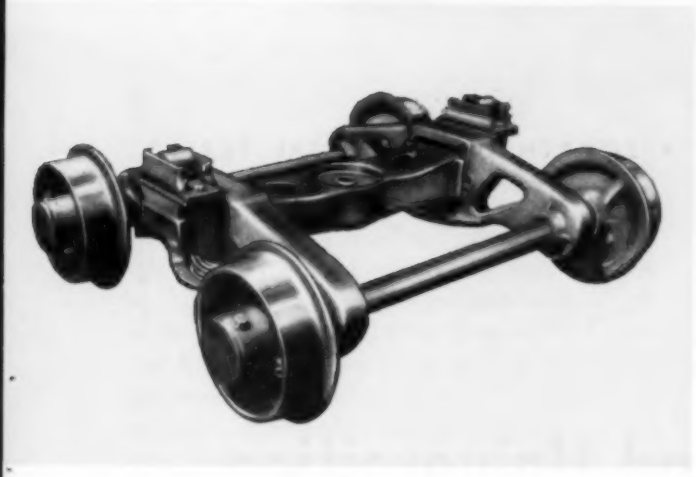
CONVERTING existing self-dumping cages into skips by installing steel boxes with lifting endgates permits one operator to increase the size of his mine cars while retaining his existing hoisting facilities. Officials at the mine developed an automatic gate-lifting mechanism operated by the movement of the cage platform, thus eliminating the external mechanism normally required.

To accommodate the skips, a crossover dump for the new and larger cars was installed at the shaft landing. Coal is fed from the track hopper into the skips through two air-operated gates manually controlled by an attendant at the landing.

As shown in the illustrations, the skips consist of steel boxes mounted on the cages after rails and dogs have been removed. Maximum capacity is 7 tons, against 2 tons for the original mine cars.

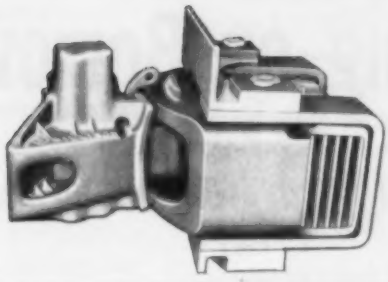
In operation, the engate is lifted by snub ropes attached to the vertical members of the main skip frame as the platform is tilted in the dumping motion. When the skip starts back down the shaft the gate drops into place of its own weight.

NATIONAL equipment cuts per-ton costs

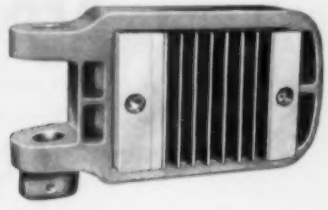


NC-1 MINE CAR TRUCK is the latest example of National's pioneering in better equipment. Among NC-1 truck advantages are longer and softer ride springs, friction damping mechanism that controls vertical and transverse oscillations, automatic frame alignment and cast one-piece bolster with large lubricated center bearing. A-9621

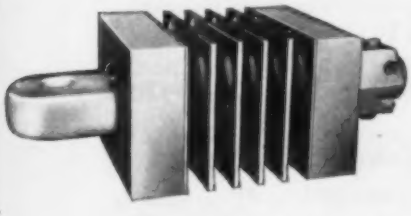
WILLISON AUTOMATIC COUPLERS save time with maximum safety, couple at either end of car or locomotive, require no manual assistance, eliminate damaging slack, permit high speeds with maximum stability.



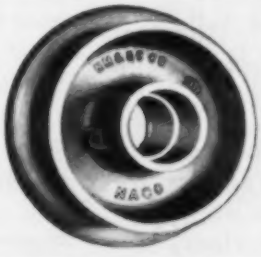
NATIONAL MI-235 Rubber-Cushioned Draft Gear primarily used in Willison spherical-horn coupler assemblies for drop-bottom cars and locomotives; are effective with link and pin bumpers and in strap yokes.



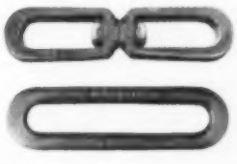
NATIONAL MI-225 Rubber-Cushioned Draft Gear for locomotives and large capacity cars not required to operate through rotary dump. Give maximum impact protection in minimum space.



NATIONAL MI-230 Rubber-Cushioned Draft Gear for cars in rotary dump service. High-capacity rubber pads with soft initial action provide maximum impact protection, lengthen equipment life. Available in capacities and designs to fit individual requirements.

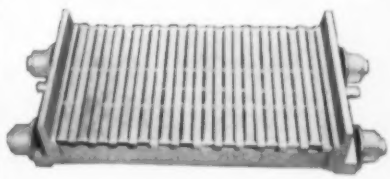


NACO STEEL WHEELS, made from quality-controlled Naco cast steel—of high yield point, great tensile strength and ductility—reduce tread spalling or flange breaking. Available in all sizes regularly used in mining or industrial operations.



NACO STEEL SWIVEL HITCHING AND LINK

CAST ALLOY STEEL ORE-GRINDING BALLS

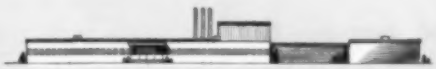


CAST STEEL PALLET AND MALLIX SINTERING BARS

See us at the Coal Show, Booth 1634

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY • Cleveland 6, Ohio

Technical Center



"Progress through Research"

FINANCIAL AID TO HIGHER EDUCATION

Our Colleges and Universities Are Living on Borrowed Time

. . . time borrowed from underpaid faculty members

The chart on this page tells a story of profound importance to every American. It is the story of the financial beating our college and university faculty members have been taking in the past 14 war and postwar years.

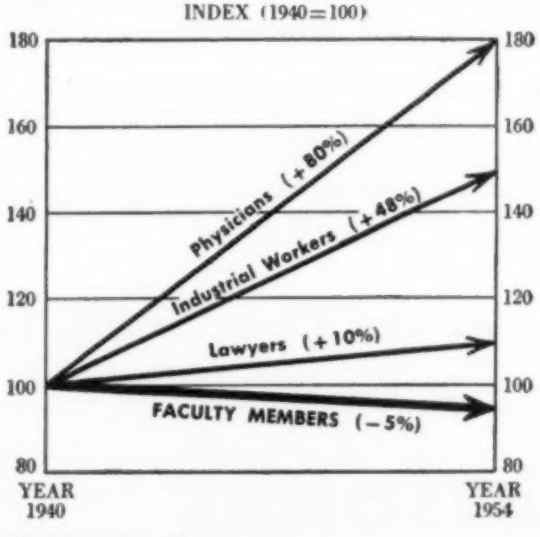
On the whole, this span of 14 years has been one of great and growing prosperity. But, as the chart shows, our college and university faculty members have, as a group, had less than no share in it.

During this period, from 1940 through 1954, the real income of the average industrial worker (that is, what his wages would purchase in goods and services) has increased by almost one-half. Among professional groups, physicians have enjoyed an increase of about 80 per cent in their real income. Lawyers, far less favored financially, have had an increase of about 10 per cent. But faculty members have not only had no increase at all; over these years of prosperity their average real income has fallen by 5 per cent. These figures do not take account of the increase in taxes since 1940.

Senior Teachers Hardest Hit

These figures are, of course, averages. For some groups of faculty members it has been better; for others worse. It has been particularly hard on senior faculty members. Between 1941 and 1953 their salaries lost about 8 per cent of their purchasing power. Being deeply committed to their careers they could not respond to alternative employment opportunities as readily as could their junior colleagues. For junior faculty members there was some increase in real income between 1941 and 1953 but only about half as much as the average for the nation.

What's Happened to College Faculty Salaries*



* Real Income before Taxes

Source: Council for Financial Aid to Education; U. S. Dep't of Commerce; U. S. Dep't of Labor.

Public Colleges Fare Better

There are also marked differences in the average financial reward received by faculty members in different types of colleges and universities. A recent study by the Council for Financial Aid to Education indicates that, in the last academic year, 1953-1954, teachers in privately endowed, independent colleges and universities were paid an average salary about $1000 less than that paid to faculty members in tax-supported institutions. The same study indicates that salaries far below the average are especially common for faculty members in the small private liberal arts colleges. This study found that during the last academic year the average salary of all college and university faculty members was about $4700.

The special difficulties under which the independent colleges and universities, and particularly the independent liberal arts colleges, are laboring to get back on their feet financially have been discussed in previous editorials in this series. These difficulties underline the need of special help for these institutions to which business firms are now contributing in increasing volume. However, the problem of providing better salaries is not peculiar to any particular type of institution.

Faculty Members Not Greedy

It is not easy to prescribe a precise standard of fair pay for college and university faculty members. This is partly because they put less weight relatively on money rewards than they put on rewards of scholarly accomplishment and prestige. Consequently, they have consistently been willing to work for very modest salaries in relation to the intellectual ability, education and application required. Obviously, however, it is the dictate both of fairness and good judgment to see that faculty members are given a roughly proportionate share in the general prosperity. Indeed, their crucial role in our society could be made to justify a larger share than this.

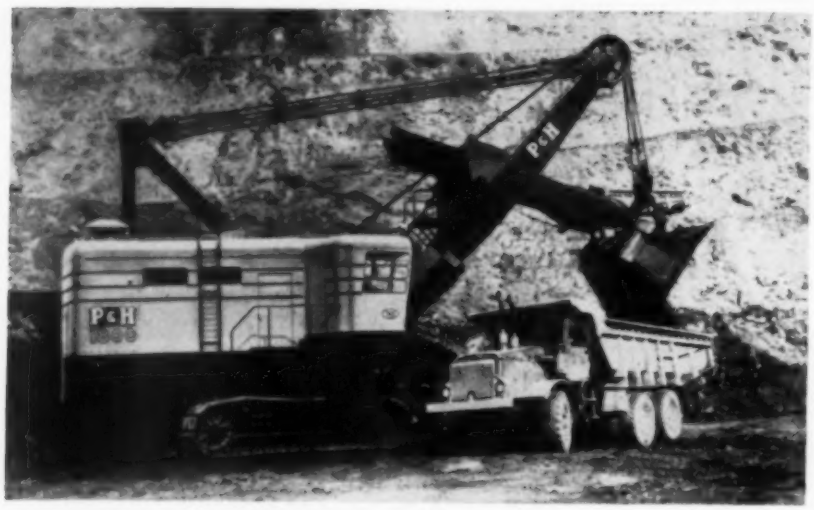
There is no way to know with any degree of precision what the underpayment of our college and university faculty members over the past 14 years has actually cost the nation in terms of reduced quality of intellectual performance of those institutions. One reason is that the damage has been minimized by the devoted services of many faculty members who have loyally stuck to their jobs in spite of the great financial discouragement.

It is obvious, however, that, if no grave deterioration in the intellectual performance of our colleges and universities has occurred so far, it is because we have been living on borrowed time. It is time borrowed from faculty members who have, in effect, been subsidizing these institutions by their financial sacrifice. This arrangement is not only a menace to the cultural and intellectual life of the nation, it is also a menace to our national security in a time when successful national survival may well depend in peculiar degree on the full development and utilization of our intellectual resources. We depend on our college and university faculties pre-eminently to provide this development. Adequate financial reward for such service is an elementary form of national insurance.

Many of our colleges and universities are working hard to improve the financial lot of their faculty members. Business firms are also playing an increasing role of providing the necessary financial assistance. The methods being used by business for this purpose will be the subject of another editorial in this series. However, **vastly more must be done, and quickly, to stop the financial beating being taken by our college and university faculty members if the nation's welfare and safety are to be properly protected.**

EQUIPMENT NEWS

8-Yd Electric Shovel Offers Varied Features



Harnischfeger's newest and largest electric shovel, the P&H Model 1800 is a heavy-duty mining shovel with an 8-cu yd capacity. Among the many innovations in large-shovel design cited by the maker are the recently announced P&H electronic control for all operating functions, centralized AC motor drive, widespread boom foot with rubber shock absorbers, and externally mounted propel brake. According to the company, the new P&H electronic control provides a more rap'd signal response from controllers for better coordination of shovel motions; a new ease of operation with two central control consoles conveniently placed at the operator's side and the stepless controllers utilizing finger-tip ease of movement; plus the tested simplicity and reliability of the electronic control system. The 1800 also features Magnetorque hoist drive for smoother, faster operation. It has a boom length of 39 ft, with 24-ft dipper sticks, stands 40 ft high and weighs 525,000 lb. Full details from the Harnischfeger Corp., Electric Shovel Div., 4617 W. National Ave., Milwaukee 46, Wis.

Heavier Blasthole Unit Drills Holes Up to 12 In

Joy Mfg. Co., Oliver Bldg., Pittsburgh, Pa., has announced a new larger model in its Champion line of blasthole drills. The new Model 60-BH is the Super Heavyweight Champion, a rotary air-blast drill designed for 9 to 12-in holes in any rock formation. Like other Champion models, the unit continuously pressure-cuts the rock with a roller-cone-type bit while a blast of compressed air continuously removes cuttings from the hole. Extra features of the Super Heavyweight cited by the maker include a rod-handling device and power air swivel which eliminate the need for climbing the derrick; a variable-speed motor operating through a five-speed transmission to give sufficient torque at any desired bit RPM and any desired tramming or hoisting speed; and fully automatic hydraulic chuck. The Super Heavyweight weighs 90,000 lb and bit pressure is rated at 60,000 lb. Bulletin D-39 offered by Joy.

195-HP Motor Grader

First new product announced by the newly organized Huber-Warco Co., Marion, Ohio, is the 5D-190, said by the maker to be the world's first motor grader to offer a power of 195 hp.

WHAT TYPE "STACKER" DO YOU NEED IN YOUR BUSINESS?

BARBER-GREENE SUPPLIES THEM ALL

RADIAL STACKERS

Radial stackers have a pivoted receiving end about which the conveyor revolves to load direct to truck, to load in a kidney-shaped pile or to classify into different bins. May be mounted on swivel wheels or on swivel trucks operating on curved rails. Rotation is by hand or power. Furnished in all belt widths to lengths as great as 120 feet on curved rail tracks.

TRAVELING STACKERS

As the name suggests, traveling stackers may be moved from one position to another to make stock piles in various sizes and locations. May be mounted on wheels, crawlers or trucks. One popular type is mounted on four wheel trucks to move horizontally to build stock piles in long, straight lines. Traveling Stackers are furnished in all belt widths to lengths of 120 feet.

FIXED STACKERS

The most widely used stacker system. Fixed stackers are designed for applications where the material is to be elevated and discharged from a cantilever position at the head end onto a surge pile or a disposal pile. Here, as with radial and traveling stackers, the absence of support structures in the surge or stock piles does not interfere with the operation of reclaiming machines. All belt widths and lengths.

282R

Barber-Greene

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BG

WRITE for INFORMATION

descriptive literature . . . sound movies

cost studies . . . nearby job inspection . . . plant layouts

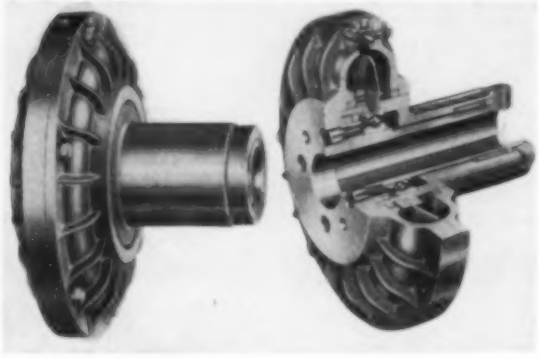
Designed for heavy-duty grading jobs, the unit is powered by a General Motors 6-71 diesel engine through a torque converter and full power shift transmission. This power train eliminates the need for a clutch and reduces shock loading, thus giving extended life to the unit and less down time for maintenance, the maker points out. Ground speed of the 5D-190 ranges from 0.85 to 20 mph, and an Allison Torqmatic transmission permits power shifts while the grader is under full load. Completely cab-controlled blade movement on the 5D-190 permits the operator to shift the blade from 90 deg on one side to 90 deg on the other in less than a minute. This operation is performed hydraulically, with no linkages to adjust manually.

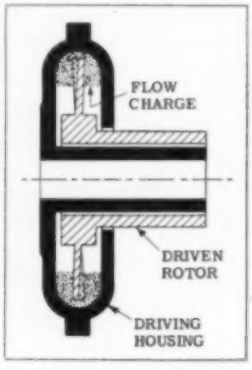
A high-arched front axle on the Huber-Warco 5D-190 gives a front-end clearance of 32 in. A 13-ft power sliding moldboard is standard equipment. Other features include: mechanical steering with hydraulic booster; high blade clearance; and retractable scarifier permitting 360 deg blade rotation without removing scarifier teeth. Full details from Huber-Warco.

Mobile Radios In 60 Models

The General Electric Co., Electronics Park, Syracuse, N. Y., has announced a complete new "Progress Line" of FM mobile and base-station two-way radio communication equipment for both 25-54- and 144-174-mg land-mobile radio services. It is said by the company to be the first complete line of mobile two-way radio communications equipment specifically designed, from microphone to speaker, to cover the widely divergent requirements of all the numerous land-mobile radio services. The many improvements in both mechanical and electronic specifications achieved will provide the user with improved performance, freedom from obsolescence and easier, greatly simplified maintenance, thus assuring increased reliability and reduced cost of operation, it is said.

Featuring the use of plug-in chassis, the Progress Line was designed around 12 basic "building blocks" of standardized physical dimensions. Flexibility has been provided by designing each of the chassis (transmitters, receivers and power supplies) so that it is completely interchangeable with other units of its type mounted in either a base station or mobile housing. The 12 basic building blocks consist of two receiver, four transmitter and six power supply chassis. Sixty different mobile two-way radios are available as standard units by combining the appropriate "blocks." Full details from G. E.





New-Type Motor Drive Provides Constant Torque, High Shock and Overload Protection

New-type motor drive, called "Flexidyne" and described as a "dry" fluid drive, is based upon a completely new principle; easily handles difficult starting and reversing problems; and gives a new kind of protection against shock and overloads, according to the Dodge Mfg. Corp., Mishawaka, Ind. Its major advantages over any other fluid-type drive lie in the fact that it does not slip at normal operating speeds, the maker reports. At the same time, Flexidyne assures accurate overload protection since it can be set to slip anywhere from as low as 20% over full load torque to as high as peak motor torque.

Originated in Europe, where thousands of installations have already been made, the new drive has been redesigned by Dodge to American standards and is said to have wide application for drives involving heavy inertia and shock loads on such equipment as compressors, centrifuges, conveyors, crushers, etc. The Flexidyne drive is made up of a housing inside which a rotor is free to turn concentrically. Between the two are fine particles of spherical steel shot, called the "flow charge," which acts very much like a fluid. The amount of the flow charge determines the torque capacity, and since the charge may be easily varied the Flexidyne will give the exact starting torque needed for anything from the smoothest to the fastest start, it is said. During starting and overload periods the current draw is at a minimum, because with the standard Flexidyne setting the motor is never pulled down to less than 90% of synchronous speed.

Aside from Flexidyne's low first cost, low maintenance and top efficiency, the company notes that it permits the use of smaller, cheaper motors and controls, with greatly reduced current demands and improved power factor; elimination of breakage and reduced maintenance on drives, gears, bearings and driven machinery. Two lines will be available: (1) Flexidyne drives for mounting directly on motor shafts and adapted for Dodge Taper-Lock sheaves; and (2) Flexidyne couplings with Taper-Lock bushings for straight-line drives. First to be offered from stock will be four sizes of Flexidyne drives, rated 3 to 30 hp at 1800 rpm. Other sizes will follow. Full data from Dodge Mfg. Co.

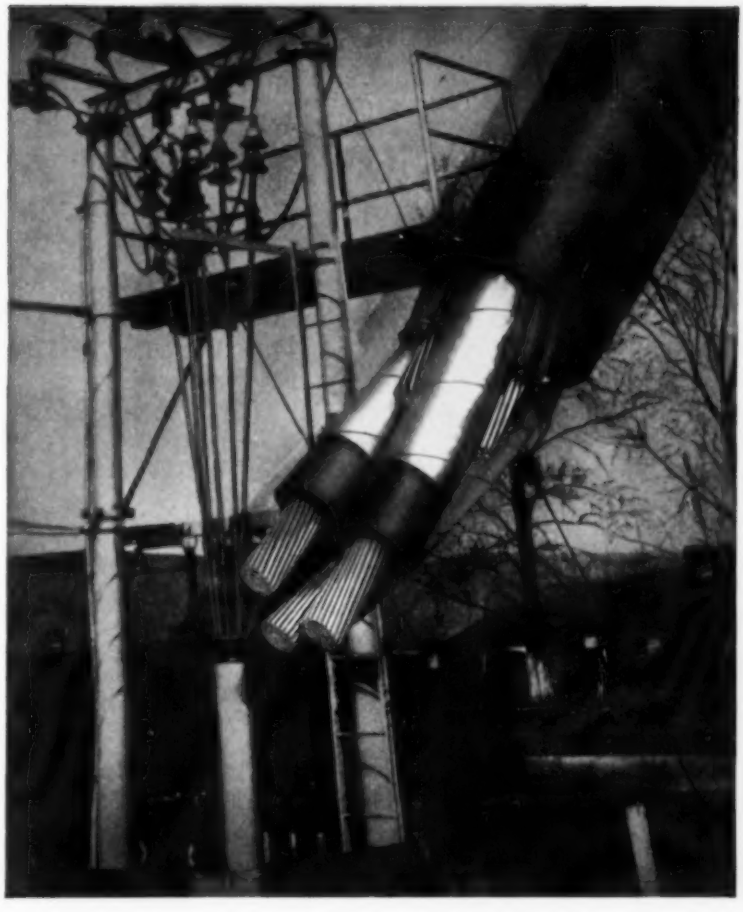
MILDEW-FREE FIRE HOSE

A new mildew-resisting waterproofing material, developed by the B. F. Goodrich Co., Akron, Ohio, resists moisture absorption and mildew attack on fire hose jackets 10 times more effectively than any other known method, the company reports. In addition to preventing hose failure from mildew rotting, treating hose with "Superseal" is said to provide excellent water-repellent action that maintains hose flexibility in weather conditions that freezes the covers of conventional hose and reduces hose weight as compared with that of water-soaked base. The Superseal treatment is available in all sizes of fire hose at no increase in cost over standard charges for treated hose.

ENCLOSURES STRONGER, LIGHTER

New nodular cast-iron enclosures for AB-1 circuit breakers in hazardous locations permit stronger construction while achieving a weight reduction of 45% over conventional cast iron, reports the Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa. Wide machine-

HAZARD mine power feeder cable:



versatility for mine feeder installations

Hazard Mine Power Feeder Cable is a non-metallic armored, shielded, high-voltage cable that provides the solution for virtually every mine power distribution problem. It can be suspended vertically in borehole or shaft, run horizontally in underground entries or suspended from messenger and supporting insulators. Design of the cable permits direct burial in trenches or installation on the mine floor, since it is highly resistant to the action of mine water and abrasion. In addition, the cable, classified as semi-portable, is easy to move and handle at all times.

Hazard Mine Power Feeder Cable conductors are covered with Semicon tape to prevent internal corona cutting. The Keystone high-voltage insulation is resistant to heat, moisture and ozone, giving maximum service life under all conditions. Cable tape on each insulated conductor is colored for permanent identification. Copper shielding tape provides ground fault protection over each conductor, and bare ground wires in contact with the shielding assure low-resistance ground in the event of shielding failure or ground fault in the equipment.

Hazaprene ZBF fillers in the interstices prevent wicking-in of moisture and make possible a tight-fitting, compact construction that will resist abuse and improve flame resistance. A Hazaprene ZBF sheath overall protects the cable against abrasion, moisture and other dangers of mine service.

Complete information on Hazard Mining Cables is available from your Hazard representative or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

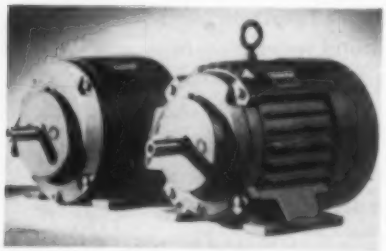
2191

HAZARD *insulated cables*

ground flanges and close-fitting operating handle mechanisms prevent internal arcs from igniting explosive or combustible atmospheres, it is pointed out. The Type 7 enclosure is offered for NEMA Class I, Groups C and D locations where potentially explosive vapors are present. Covers are secured by high-tensile-strength steel bolts with suitable plating to make them corrosion-resistant. Presently available in standard ratings between 15 and 100 amp, AB-1 breakers in the new enclosures can be equipped with all conventional accessories.

LIGHTWEIGHT RAIL CLAMP

A new lightweight rail clamp that can carry 400 amp continuously without overheating has been announced by the Ohio Brass Co., Mansfield, Ohio. Weighing only slightly more than 1 lb the clamp may be attached to the base of any-size rail up to 100 lb and will handle cable sizes from No. 14 to 2/0. The clamp is held securely on the rail by a cup-pointed set screw which bites through scale and rust to provide positive electrical contact, the maker states. A swivel-action handle is permanently attached to the head of the set screw. Clamp body is made of malleable iron; the clamp-type cable connection and handle of aluminum bronze.

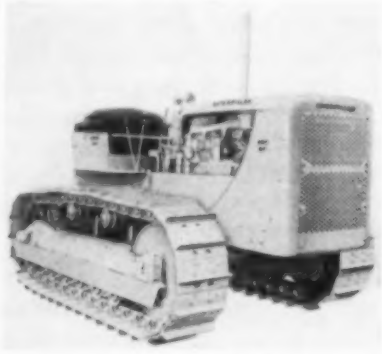


AC MOTOR LINE "PROTECTED"

Its new line of "Totally-Protected" AC motors combines eye appeal, rugged construction and precision performance according to the Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, Ohio. Regardless of mounting positions, the new Reliance "Protected" AC motor offers complete protection against drip, splash and falling objects, and combines varied construction features providing continuous motor performance along with an overload service factor. A complete integrated line is available, including enclosed fan-cooled, corrosion-proof and explosion-proof designs. Bulletin B-2401 from Reliance.

PORTABLE INSPECTION UNIT DETECTS MACHINERY FLAWS

Now available in the United States, the "SempuN" magnetic flaw detector, used in England for several years, is a portable magnetic inspection tool designed to indicate surface and sub-surface flaws in machinery, parts and welds. Small in size and weighing 11 lb, the "SempuN" unit is a permanent magnet requiring no electric current, with unique ball pivots and multi-self-adjusting magnetic pins that provide good contact during use on any size or shape of part. The unit is supplied complete with check test piece, re-magnetizing leads and plastic spray bottles containing the inspection medium, all in a small convenient carrying case. Although the "SempuN" unit will retain its magnetic force over long periods of time, re-energizing is accomplished quickly and easily by flashing the system across a 12- or 6-v battery, it is said. Bulletin with full details from the national distributor, Rice-Peterson Sales, Inc., P. O. Box 1114, Palo Alto, Calif.

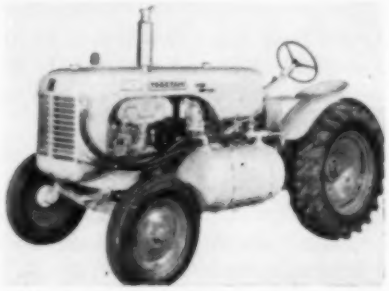


TRACTOR'S POWER BOOSTED

Increased horsepower and engine speed highlight the many new engineering improvements which have been introduced in its new D7 track-type tractor, according to the Caterpillar Tractor Co., Peoria, Ill. The engine has 128 hp at 1,200 rpm, compared to the 108 hp at 1,000 rpm in the previous model, and maximum drawbar pull for the D7 is now 28,700 lb, up approximately 3,500 lb. Another important innovation reported is an engine balancer which reduces vibration and permits the four-cylinder engine to operate at 1,200 rpm with the same degree of smoothness as a six-cylinder design, the maker says. Other new major engineering features cited as contributing to greater productive capacity in the new D7 include: redesigned engine block; new fuel injection system; a new starting engine; new radiator; larger fuel tank; new fuel filter system; redesigned oil filter base adapter; and improved air cleaner. Full data from Caterpillar.

HEAVY-DUTY VACUUM CLEANER

A new heavy-duty electric vacuum cleaner for industrial and automotive use has been announced by The Black & Decker Mfg. Co., Towson, Md. The caster-mounted, easily moved unit is said to have up to 20% more cleaning power, a dry capacity of 1½ bu of dirt, and a wet recovery capacity of 13 gal. The No. 95 Vacuum Cleaner will move 75 cu ft of air per minute through a 1-in orifice, and has a 1¼-hp motor designed especially for vacuum cleaning. It is sealed against dirt and water and has its own cooling fan. An outstanding feature cited by the maker is the super-flexible accordion-type 5-ft hose that may be expanded to measure 15 ft. The hose has a 1½-in diameter throughout to permit passage of more air for more thorough cleaning and the pick-up of larger objects. Varied standard and optional accessories are available for specific cleaning requirements.



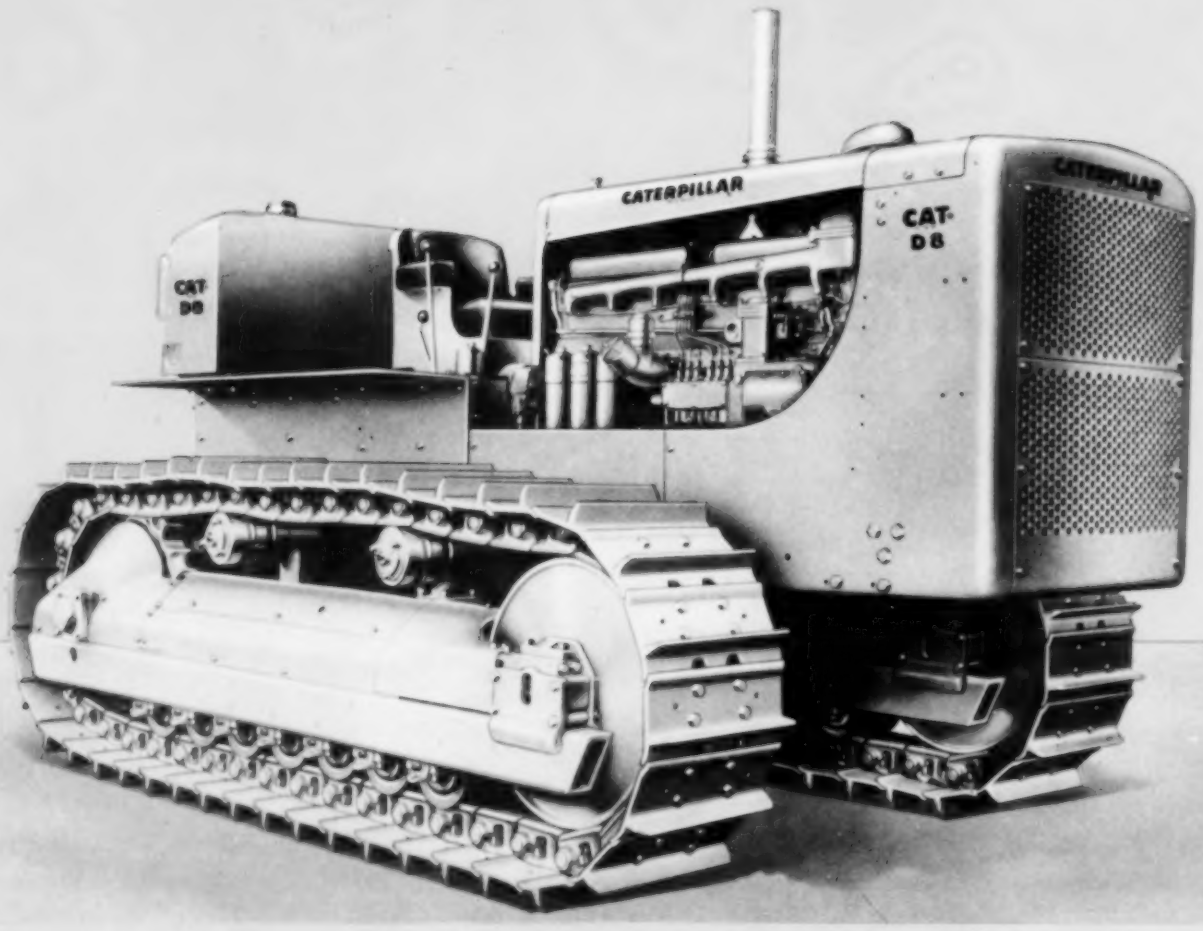
125-CFM COMPRESSOR-TRACTOR

To provide even greater versatility, the air output of the Le Roi Tractair has been increased from 105 to 125 cfm at no increase in price. Combining a 125-cfm air compressor and a 35-hp wheeled tractor, the Tractair is designed primarily to bring compressed air power to otherwise hard-to-get-at places, and can per-


NEW

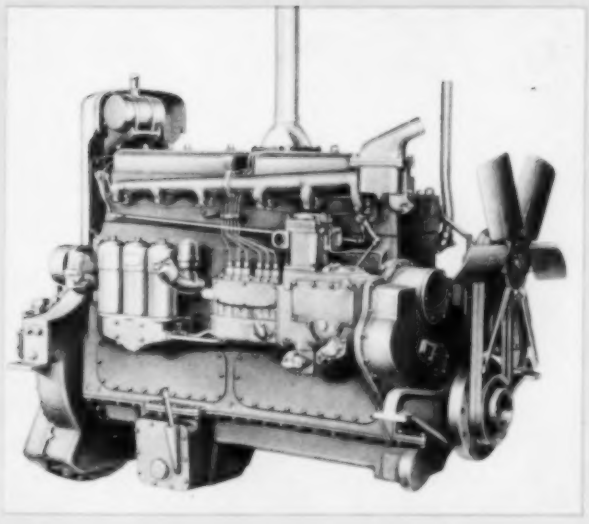
CATERPILLAR ANNOUNCES THE NEW D8

SERIES D and SERIES E

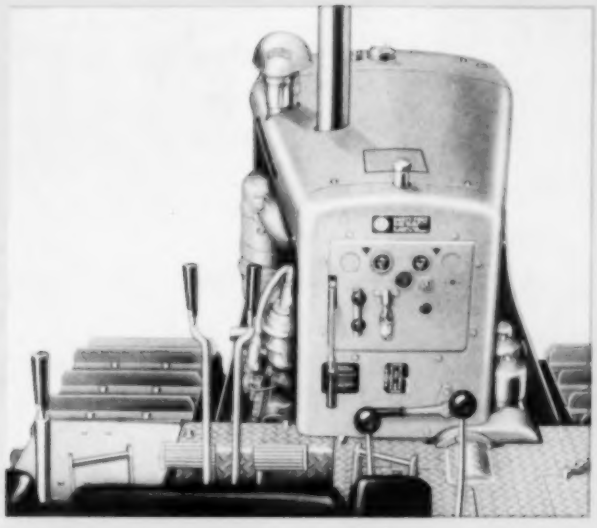


Choice of TORQUE CONVERTER or DIRECT DRIVE

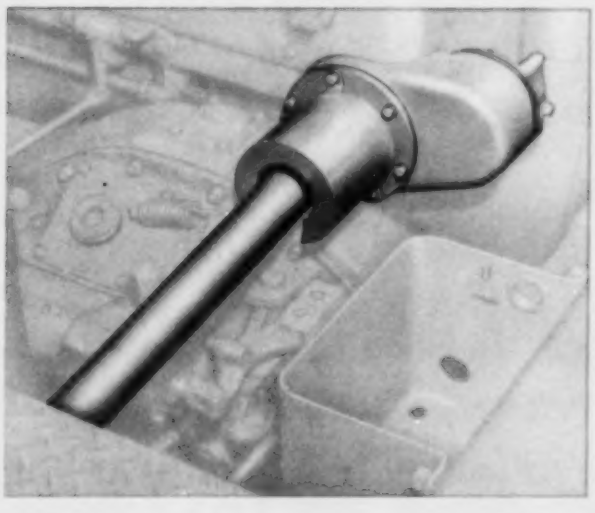
You're looking at a major advance in tractor design—the new Caterpillar D8 Tractor. While it still bears the name of the unit that earned world-wide recognition as "boss of the crawlers," it is basically a *new* machine with 155 HP at the drawbar and your choice of torque converter (Series D) or direct drive (Series E). From its new 7-roller track frame to its new 191-HP, 1200-r.p.m. engine, it is built to deliver an even higher standard of money-making production on *any* track-type tractor application in *any* field. Along with its advance-design features, it retains such outstanding Caterpillar exclusives as the oil clutch and certain other job-proved developments. As a result, you can figure on it for *more* work at *lower* cost with *less* down time on *any* job. For complete information about the new, heavy-duty D8 Series D and Series E, see your nearby Caterpillar Dealer.



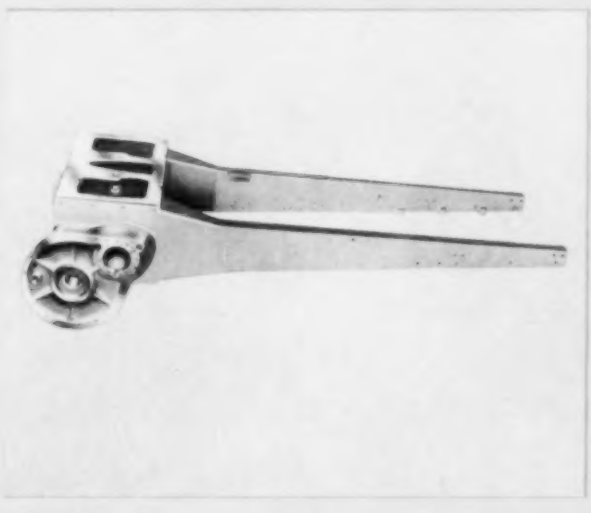
NEW ***ENGINE***, with new fuel injection system incorporating capsule-type injection valves. Flanged center main bearing to take crankshaft thrust. "Hi-Electro" hardened timing gear integral with crankshaft.



NEW ***EASY-WORKING CONTROLS*** handy to comfortable, one-man seat. The new streamlined hood affords greater visibility. The new easy-to-see instrument panel is attached direct to engine.



NEW ***"LIVE SHAFT" DRIVE***, independent of flywheel clutch. This important new feature provides constant power for rear-mounted cable controls or other equipment.



NEW ***WELDED ONE-PIECE STEERING CLUTCH CASE***—main frame assembly for a stronger "backbone." Transmission and steering clutches can be removed without disturbing other parts.

NEW ***OPTIONAL DRIVE***, torque converter or direct drive, whichever is best for your job. *Torque converter:* torque multiplication of 5 to 1 gives smooth operation in each speed range. 3 forward and 3 reverse: low 0 to 3.6 m.p.h.; intermediate 0 to 5.3 m.p.h.; high 0 to 7.4 m.p.h. *Direct drive:* 5 speeds forward and 3 reverse.

NEW ***7-ROLLER TRACK FRAME*** for greater stability, flotation and better ride.

NEW ***"WATER-QUENCHED" TRACK SHOES*** for longer life than ever before.

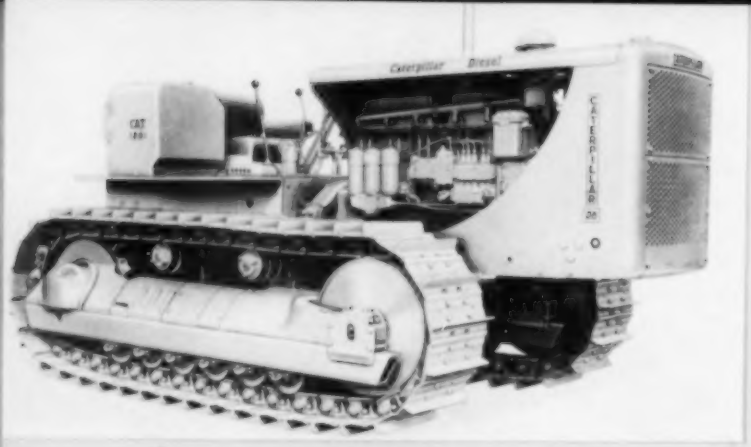
NEW ***HYDRAULIC BOOSTER STEERING***, pump drive direct from engine, independent of flywheel clutch, for maximum steering ease.

NEW ***STARTING ENGINE*** with more power for faster, surer starts in any weather.

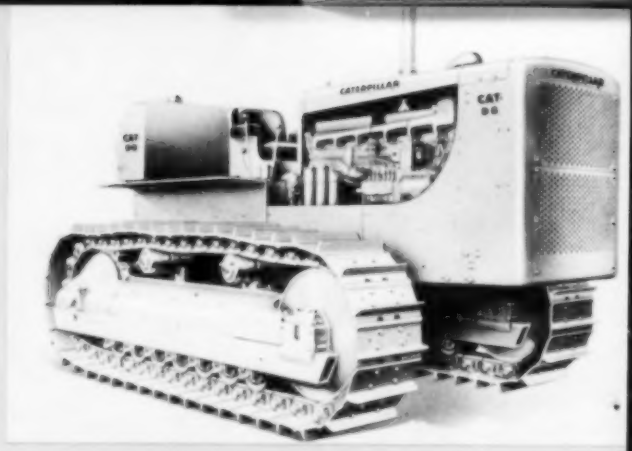
NEW ***"IN-SEAT" STARTING*** for greater convenience.

NEW ***118-GALLON FUEL TANK***, enough for normal 12-hour operation.

NEW ***ATTACHMENTS*** include cable controls—the new rear-mounted double drum No. 29 with constant power drive direct from engine, and the new front single drum No. 30. New, larger No. 8A and No. 8S Bulldozers, both cable and hydraulic controlled, are also available. The new No. 8U "U"-blade 'dozer has extra strength. Cable-controlled 'dozers use a 6-part line for greater lifting power. All equipment used on the D8 can be used on the new D8 Series D and Series E.



The D8



The NEW D8 Series D and Series E

CHECK THE DIFFERENCE ADVANCE DESIGN MAKES BETWEEN THE D8 AND THE NEW D8 Series D and Series E

	D8	D8 Series D with torque converter	D8 Series E with direct drive
Operating Weight	38,155 lb.	41,265 lb.	40,430 lb.
Ground Clearance	10½ in.	13 in.	13 in.
No. Track Rollers	6	7	7
No. Track Shoes	39	42	42
Length of Track on Ground	99¾ in.	111¾ in.	111¾ in.
Area Ground Contact 22-in. Shoe	4389 sq. in.	4917 sq. in.	4917 sq. in.
Fuel Tank Capacity	98 gal.	118 gal.	118 gal.
Drawbar	Swinging	Fixed	Fixed
Drawbar Pin Size	1¾ in. dia.	2¼ in. dia.	2¼ in. dia.
Steering Clutch	Over center spring booster	Hydraulic booster	Hydraulic booster
Steering Clutch Case	Cast iron. Integral with transmission case.	Steel fabricated. Separate from transmission case.	Steel fabricated. Separate from transmission case.
Transmission Case	Cast iron. Integral with steering clutch case.	Cast iron barrel. Separate from steering clutch case.	Cast iron barrel. Separate from steering clutch case.
Main Frame	Box section bolted to cast case.	Box section welded to steel case.	Box section welded to steel case.

Production-wise and profit-wise, you have a new yardstick of performance in the CAT* D8 Series D and Series E. Your Caterpillar Dealer, source of prompt service, will be glad to show you how this rugged new yellow machine can pay off for you!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

MAIL TODAY!

CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A.

Please send me additional information on the D8 Series D and Series E.

Name _____

Company _____

Street _____

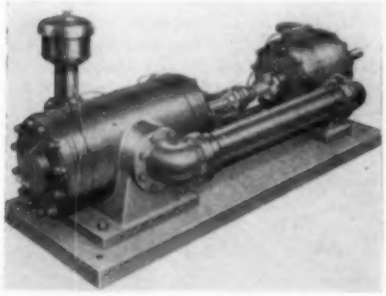
City _____ Zone _____ State _____

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

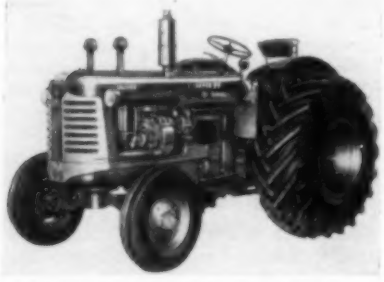
The new D8 Tractor —another example of CATERPILLAR LEADERSHIP in action

form the work of much more expensive combinations of single purpose equipment, the maker points out. New standard equipment on the Tractair includes additional piping, larger carburetor, aftercooler and an Econotrol that varies engine speed to match air demand. The rubber-tired Tractair has five traveling speeds up to 17 mph and features various attachments, such as: Mobildrill, highway patch drill, multiple tamper, winch, backhoe, front-end loader, backfill blade, utility boom and utility platform. Le Roi Div., Westinghouse Air Brake Co., Milwaukee 14, Wis.



COMPRESSOR/VACUUM PUMP

A new line of two-stage 100-lb rotary air-compressor/vacuum pumps for shop air systems, drill rigs, pneumatic conveyors, gas compression and similar applications has been announced by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. The new pump is water cooled and consists of a separate low-pressure unit coupled to a high-pressure unit, both mounted on a common bed plate. It is designed for direct connection to motors, but may be gear-driven by motors, engines or turbines. The new A-C equipment is available in eight sizes to handle from approximately 250 to 1,800 cfm and for pressures ranging from 60 to 125 lb.

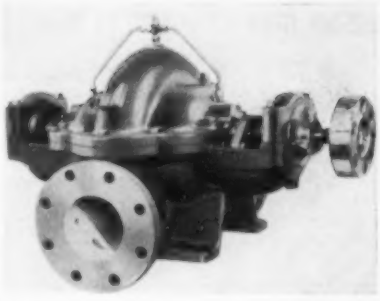


POWERFUL WHEEL TRACTOR

The totally new Oliver Super 99 GM diesel is said by the maker to be the most powerful general-purpose tractor on wheels, developing 72 hp on the drawbar and 80 hp on the belt. In addition to being entirely new in design, the Oliver Super 99 GM diesel is powered by an engine vastly different in principle than those in wheel tractors currently produced; the widely known 2-cycle GM diesel engine. It starts quickly on diesel fuel alone, with no auxiliary engine or special fuel needed, and provides an exceptionally smooth flow of power, the maker reports. Other advancements cited include a six-forward-speed transmission, a flat operator's platform with an abundance of room, double-disc differential brakes and a recirculating ball-type steering gear for easy handling. Full details from the Oliver Corp., 400 W. Madison St., Chicago 6, Ill.

WATER-TIGHT ENCLOSURES

A new water-tight enclosure for all combination linestarters through NEMA Size 2 is now available from the Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa. Fabricated from sheet steel, the new enclosure is lighter and easier to install than conventional cast-iron enclosures, the maker reports. Finished in bright aluminum, the enclosures are equipped with Oil-Tite push buttons with neoprene caps where required to prevent accumulated ice or sleet from interfering with push-button operation. A neoprene gasket and cover held secure by screws makes this enclosure weatherproof, water tight and dust tight, it is said. Ample wiring is provided within the enclosure and a control-circuit transformer, for example, is easily added. External mounting feet and conveniently located knock-outs facilitate installation and service.



GENERAL-PURPOSE PUMP

New type KS pump developed for air conditioning and general purpose applications has been announced by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. The new double-suction pump has a horizontally split cast-iron casing, a bronze double-suction type impeller, well-sealed, grease-lubricated ball bearings, and deep but easily accessible stuffing boxes, the maker reports. It is now being offered in five sizes ranging from 3 x 2½ in, 1,750 rpm, at 150-ft head, to 6 x 6 in, at 100-ft head. Construction features of the pump are described in new Bulletin 08B8233 offered by Allis-Chalmers.

Equipment Shorts You'll Want to Check

NEW FIRE HOSE announced by Hamilton Rubber Mfg. Corp., Trenton 3, N. J., uses du Pont "Dacron" as filler cords to permit a lighter, more flexible hose with less bulk and maximum strength. Compared to conventional cotton types, "Flexrite" hose racks and handles easier and folds tighter to save space. Offered in 1½- and 2½-in I.D., double-jacket construction, tested for 400-lb pressure.

GENERAL-PURPOSE AC WELDER designed for job shops and light industrial applications, the G-E Type WK29A has a current range of 25 to 295 amp and is a low-cost welder ideal for maintenance work, tack welding at high currents and steady welding at moderate currents, the company reports. It includes a 230-v primary circuit and provides pinpoint accuracy of current settings and resettings. For heavier applications, G-E makes a separate Type WK29L with a 230-460 reconnectable primary circuit. Full details from the Welding Dept., General Electric Co., Schenectady 5, N. Y.

EARTH DRILL is the newest matched attachment designed to increase the versatility and performance of the Allis-Chalmers HD-5 50-hp crawler tractor. Driven through the tractor's power takeoff, the Model YT drill is mounted without disturbing either the front-mounted shovel or dozer already on the tractor and can bore holes up to 24 in in diameter, with an optional pole setter handling poles up to 45 ft long. Suggested jobs include post and pole drilling, exploration for foundations, soil sampling, etc. Tractor Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

ELECTRICAL VARNISH, a modified silicone dipping and impregnating varnish developed by the Dow Corning Corp., Midland, Mich., is said to substantially increase the durability of electrical equipment insulated with Class B components. Called Sylkyd 1400 varnish, it combines good heat stability with excellent bond strength and outstanding resistance to moisture, oils and solvents. According to the maker, it has an insulating life expectancy 25 to 50 times that of good organic varnishes at the Class B hottest temperature of 130 C, and while not intended for Class H temperatures will stand up in the 180- to 200-C range for short periods.

EYE SHIELD, the new Willson Style FW3 "FeatherSpec" is especially designed to provide ample impact protection for light grinding, woodworking, spot welding and other jobs that do not require heavy duty goggles. The distortion-free, thick-acetate lenses are held well away from the eyes for better ventilation and more clearance for prescription glasses and can be removed easily and quickly. Willson Products, Inc., Reading, Pa.

NEW LINE OF SPRAY NOZZLES made of "Teflon" are non-clogging, corrosion-resistant with practically any spray, long-wearing and inexpensive, according to the maker, Bete Fog Nozzle, Inc., 309 Wells St., Greenfield, Mass. With no internal parts, strainers can be eliminated. The new TF Series is available in 10 models, from 50- to 120-deg hollow cone spray pattern in five flow rates from 5 to 50 gpm.

NEW 3-YD BUCKET now available

for attachment to the No. 6 Traxcavator is a two-position bucket designed to handle more rapidly products such as coal, cinders and other light materials weighing 2,000 lb or less per cu yd. Other new design features for the No. 6 and HT4 Traxcavators announced by the Caterpillar Tractor Co., Peoria, Ill., include triple grouser shoes, said to give better traction than the flat center shoe while retaining the flat-surface feature needed for hard-surface work. Now standard equipment on the units and can be added in the field.

WATERPROOFING COMPOUND, called "Permagile," comes in paste form which, when subjected to setting agent, turns into a hard, strong mineral-like substance that will form a permanent barrier against water seepage on interior walls, the maker reports. Cracks and voids in cement, cinder blocks, masonry, etc., so filled and sealed provide a joint stronger than the material it joins, it is said. Bulletin with details from Permagile Corp. of America, 32-14 Northern Blvd., Long Island City, N. Y.

AIR STARTING MOTOR, the Size 5BM, is the third in the I-R line and is designed for starting service on gasoline engines from 750- to 1,750-cu in displacement and diesel engines from 300 to 700 cu in. Smaller and more compact than equivalent electric starters, the air unit is reliable at all times and eliminates the need for generators, batteries and cost of battery maintenance and replacement, the maker points out. Bulletin 5152 from Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

FLEXIBLE PLASTIC PIPE made by the Triangle Conduit & Cable Co., New Brunswick, N. J., now is coiled on a disposable, combination reel-and-package. Advantages cited by the maker include elimination of "tag-end" pieces with the use of longer lengths; quicker and easier use; compact stacking of reels to save storage space; and protection of pipe from dirt, sunlight and mechanical damage.

FREE BULLETINS AVAILABLE

SAFETY EQUIPMENT—New 64-p General Catalog 54 on industrial safety equipment is available from Willson Products, Inc., Reading, Pa. This new, easy-to-read, fully illustrated catalog is designed as a workable, everyday safety manual and is divided into four major sections: eye protection, head protection, respiratory protection, and welding. Illustrations, descriptions, and ordering information have been correlated for simplicity and practicability.

CONTINUOUS MINER—Catalog 877 describing the 76-AM Colmol for continuous mining in low-vein coal is offered by the Mining Sales Div., Jeffrey Mfg. Co., Columbus 16, Ohio. This 12-p catalog includes installation photos, details of construction and operation, a dimension drawing and general specifications. The 76-AM Colmol is a high-capacity boring-type machine for coal seams 38 in and up.

VIBRATING SCREENS—Complete line of Link-Belt CA vibrating screens for medium and heavy duty screening operations including scalping, sizing, dewatering and rinsing, is described in a new 12-p Book 2554. The book contains helpful engineering information—including capacity charts—to aid in selecting a vibrating screen for use with a given material at a specific capacity. From Link-Belt Co., Dept. PR, 307 Michigan Ave., Chicago 1.

INSTRUMENT TRANSFORMERS—1955 edition of the G-E Instrument Transformer Buyer's Guide, containing basic, up-to-date information on the complete G-E line, is available from General Electric Co., Schenectady 5, N. Y. The 100-p publication, designated GEC-1028, contains ratings, ASA accuracy classifications and prices of all standard G-E indoor and outdoor potential and current transformers. Listings of ratio and phase-angle tests, tables of replacement types, and mechanical and thermal data are included.

DIPPER TEETH—To aid power shovel users in picking the right repointer style for dipper teeth, American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill., offers a revised guidebook, WA-77, which incorporates latest developments in repointer design as well as the latest welding rods for attaching or hardfacing the teeth. Included is a step-by-step procedure on how to successfully repoint, with sizes shown in chart form together with suggested uses for manganese steel bars, flats and plate.

EDDY-CURRENT BRAKES — Dynamatic Div., Eaton Mfg. Co., Kenosha, Wis., offers a bulletin describing eddy-current brakes and associated controls for numerous and varied braking requirements; available in a wide range of sizes and designs to meet most demands or on special order to suit individual conditions. Dynamatic eddy-current brakes, differing from friction brakes, have no mechanical contact between the rotor and stationary field; therefore, operation is smooth and shock free, the company points out. Standard units in both the air- and liquid-cooled types are described in Bulletin BR-1.

URANIUM MINING—For those interested in this new industry, a new edition of "Mesa Miracle," a 36-p booklet describing the fast-growing uranium industry on the Colorado Plateau has been published by United States Vanadium, a Div. of Union Carbide & Carbon Corp. The booklet takes the reader back into the hills of the colorful mesa country to visit the thousands of people who are taking part in the mining and processing of uranium ores and discusses the various stages of mining, exploration work, milling and trucking. Write to United States Vanadium Co., Room 308, 30 E. 42nd St., New York 17.

MAGNETIC AMPLIFIERS — Technical aspects of "Magamp" magnetic amplifiers for control applications are discussed in a 20-p Westinghouse booklet. It explains

The Price Alone of CRD one-use bits can lower your drilling costs

. . . and they are made and backed by CLEVELAND Rock Drill

How do Cleveland CRD one-use bits save you money? It's just plain economics. You see, the price of CRD bits on an average, is less than one-half that of a multi-use bit. In fact, the price of a CRD bit comes close to matching the cost of reconditioning a multi-use bit.

So the price alone of CRD one-use bits can help you cut your drilling costs. But there are other reasons to use CRD bits, too.

Faster Drilling Speed — Special offset gauge feature, which permits the use of thinner wings and a steeper reaming angle, greatly reduces binding and provides ample clearance for cuttings. Result is a free, fast-cutting, chiseling action that gives you greater drilling speed.

Less Drill-Steel Breakage — The method of attachment used with the CRD bit eliminates threads on the drill rod. Since a drill rod is only as strong as the root diameters of its threads, the tapered threadless CRD design provides longer drill-steel life — reduces drill-steel handling and reconditioning costs.

Lower Rock Drill Repair Costs — Because the CRD bit design reduces binding in the hole, there is less strain on the rotation parts of your rock drills. Rifle bars, rifle nuts, and chucks last longer. You get more drilling done at lower cost.

Since no special equipment is needed for reconditioning bits or threading rods, you owe it to yourself to try a can of CRD bits. They're ideal for roof-bolting. A short trial will give you first-hand information on the ability of these bits to cut drilling costs in your property, as they have in so many others.

Bulletin RD-29 gives detailed information. A copy is yours for the asking — just write for it.

SPECIFICATIONS

Mines everywhere cut drilling costs with CRD DETACHABLE DRILL BITS
4-Wing Type — Center Hole — Side Hole

Series "A" Bits For series "A" drill steel connection on any steel. Best suited to ⅞" steel.	1¼	Aluminum	Series "B" Bits For series "B" drill steel connection on any steel. Best suited to 1", 1⅛", and 1¼" steel.	1⅞	Orange
	1⅜	Pink		1½	Green
	1⅜	Deep Green		1⅝	Yellow
	1⅜	Brown		1⅝	White
	1½	Grey		1¹¹⁄₁₆	Black
	1⅝	Maroon		1¾	Red
	1⅝	Deep Blue		1¹³⁄₁₆	Blue
				1⅞	Tan
				1¹⁵⁄₁₆	Plain
				2	Pink
				2⅛	Maroon
				2¼	Aluminum

Cans are labeled showing size of steel socket, gauge of bit, and color.

CLEVELAND ROCK DRILL DIVISION
Westinghouse Air Brake Co.

12500 BEREA ROAD . CLEVELAND 11, OHIO

RD-61

the basic theory underlying magnetic amplifier operation, gives information necessary for application, and describes operating characteristics. The magnetic amplifiers described have a power output of 0.03 to 325 w, 6.3 to 230 v, 0.015 to 1.7 amp. Request Technical Data 52-600 from the Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30.

STEEL BUILDINGS—New 24-p manual (SX-2054) on Armco steel buildings covers Series S, Type 1; Type 2; and Type 3 buildings; multiple-span buildings; and lean-to units. Accessories are described and illustrated, and instructions for erection and finishing are included. Many uses in various industries are pictured, from small utility buildings to architectural applications. From Product Information Service, Armco Drainage & Metal Products, Inc., Middletown, Ohio.

ROLLER BEARING—Bulletin describes Rollway Bearings new self-contained cartridge roller bearing designed for use on farm and industrial materials handling equipment, and said to be easily installed. It is available in three types of rollers: hardened but unground, hardened and ground, or unhardened and unground. Catalog lists shaft and housing dimensions and bearing radial load ratings at 100 rpm. Rollway Bearing Co., Inc., 541 Seymour St., Syracuse, N. Y.

ALLOY STEELS—New 200-p handbook entitled "Alloy Steels Pay Off" is offered by the Climax Molybdenum Co., 500 Fifth Ave., New York 36, to engineers and purchasing and management personnel interested in the practical utility of alloy steels in modern equipment design. Highlighted are the economic advantages of fabricating with alloy steels for improved weight-to-strength ratios, longer life and less maintenance, heavier payloads and lower operating costs. Advantages of high impact strength and shock-load resistance are discussed, as well as savings from improved resistance to corrosion and wear. Such economies are documented by more than 60 case histories.

LINER PLATES—Booklet, "Tunnels Do It Better," describes speed of installation with Armco liner plates, and discusses the low cost, use of simple tools, strength of plates, varied applications. Useful data includes detailed drawings and physical properties. From Product Information Service, Armco Drainage & Metal Products, Inc., Middletown, Ohio.

DIAMOND DRILLING—New 16-p booklet describes Hillmac-Coldset diamond coring and drilling bits and the company's engineered diamond-drilling service, which includes rental and maintenance of core barrels, furnishing of skilled, experienced operators, etc. Offered by the Hillmac-Corp., 509 S. Lorraine St., Midland, Tex.

BULLDOZER BLADES—International hydraulic "Bullgrader" and bulldozer blades matched to International T-6, TD-6, T-9, TD-14A and TD-18A crawlers are described with full specifications in a 24-p catalog by International Harvester Co., 180 N. Michigan Ave., Chicago 1. The bulldozer blade assembly is solid welded without pin connections, providing a rigid, level blade. The Bullgrader blade, connected by pins to the main frame, may be horizontally angled or vertically tilted.

SHOVEL-LOADER—The versatile new International Drott "Four-In-One" Skid-Shovel is described in a catalog offered by Drott Mfg. Corp., Milwaukee, Wis. Whether the unit is moving or standing still, the operator, merely by placing the "shovel selector" in the desired position, can convert the Four-In-One into a bullclam shovel, a bulldozer, a skid-shovel or a clamshell, the company points out. Bulletin provides full operating and specification data.

COMPRESSED AIR—A new I-R engineering service bulletin, "A Better Air Power System," points out that power losses in compressed air lines are frequently as much as 30 to 50% and describes how to go about finding out if more air is being wasted than the repair and renovation of the distribution system would cost, with detailed step-by-step procedures to be taken to bring the system up to accepted standards. Form 213-A, from Ingersoll-Rand Co., 11 Broadway, New York 4.

FLOTATION UNIT—How the Denver "Sub-A" Super Rougher flotation machine has been engineered to handle large volumes of pulp with the greatest possible efficiency is discussed in Bulletin F10-B87, available from the Denver Equipment Co., P. O. Box 5268, Denver 17, Colo. Dimensions and specifications are included.

WELDING SUPPLIES—New 36-p catalog covers complete Air Reduction line of arcwelding and oxyacetylene welding supplies and accessories. Included are welding rods, fluxes, brazing alloys, goggles, helmets, shields, electrode holders, protective clothing, cable, clamps, hose, lighters, cylinder trucks and carrying cases. Form ADC 848, Air Reduction Sales Co., 60 E. 42nd St., New York 17.

TRUCK BODY AND HOIST EQUIPMENT—Bulletin BH-54120 covering the entire line of Heil truck equipment features Heil dump bodies and twin-arm hoists, lightweight telescopic hoists and dump bodies designed exclusively for them; also conversion hoists, rock bodies, Heiloader hydraulic elevating truck tailgates, etc. Bulletin 55101 on the Heil SL-11 contractor's dump body covers construction and design details of the body, with a capacity of 2 cu yd and up. Both from The Heil Co., Milwaukee 1, Wis.

INDUSTRIAL TV—Catalog E-51 describes the new RCA ITV-6 industrial television equipment, with full details on the features, applications and construction of the ITV-6 closed-circuit TV system. Specifications also listed. From Radio Corp. of America, Engineering Products Div., Building 15-1, Camden 2, N. J.

TANKS—Denver wood, steel and rubber-covered types are covered in 16-p Bulle-

tin T2-B5 published by Denver Equipment Co., P. O. Box 5268, Denver 17, Colo. Construction, dimensions, specifications and prices are given for bolted steel tanks, bolted steel thickener tanks, bolted steel tray tanks, welded steel tanks and wood tanks, as well as a complete description of overflow launders available for every purpose.

PUMPS—Bulletin G-1 offers full data on design, application and operation of LaBour Type CG packingless, self-priming centrifugal pumps for both flooded suction and suction lift operation. From the LaBour Co., Inc., Elkhardt, Ind.

EXCAVATORS — Bulletins combining complete descriptions and specifications of the Wayne full ¾-yd crane-excavator are offered by the Wayne Shovel & Crane Div., American Steel Dredge Co., Inc., Ft. Wayne, Ind. Bulletin 424 describes features of the Model 70 Crawler-mounted Wayne machine; Bulletin 425 covers the 50A and 50B truck-mounted Wayne models.

POWER UNITS—Bulletin E-9 describes and illustrates the 115- to 410-hp Le Roi L3000, H2000 and F1500 engines for power generation. pumping and other general and specialized industrial applications. From Le Roi Div., Westinghouse Air Brake Co., 1706 S. 68th St., Milwaukee 14, Wis.

THERMOCOUPLE AND PYROMETER SUPPLIES—New edition of 56-p Bulletin P1238 on thermocouples and pyrometer accessories is available from the Bristol Co., Waterbury 20, Conn. The bulletin, a "Buyer's Guide and User's Manual," contains extensive engineering data on the selection and installation of the proper types of thermocouples, wells, head assemblies and other pyrometer accessories, as well as recommended thermocouples for specific installation in various industries.

MEASURING AND CONTROLLING LIQUID LEVEL—Bulletin 1161 includes a discussion of the basic principles of liquid level measurement, control and transmission. Systems are described in detail along with the applications, principles of operation, limitations and advantages of each. From Industrial Div., Minneapolis-Honeywell Regulation Co., Wayne & Windrim Aves., Philadelphia 44.

PUMPS—Bulletin 1230-BL on Worthington contractors' portable self-priming centrifugal pumps offers detailed information on construction, specifications and component parts, rating charts, pumping-unit and engine data for the various models. Specifications for Worthington's frame-mounted self-priming centrifugal pumps also are provided. From Worthington Corp., Harrison, N. J.

FLOW MEASUREMENT & CONTROL—New 20-p Bulletin 115 gives complete information on Brooks "Full-View Rotameter" for flow measurement and control. Flow capacity charts; design, construction and various modifications of

standard meters; and full line of accessory equipment are included. From Brooks Rotameter Co., Lansdale, Pa.

WELDING MOVIE—A new 20-min motion picture, in full color with sound, produced by Air Reduction on the Heliweld process is entitled "Nothing But The Best." Telling the story of Airco's tungsten inert-gas arcwelding process, the movie shows typical applications of Heliwelding with production scenes shot in customers' plants, and pictures manual, semi-automatic and completely mechanized equipment in use. Metal fabricators, business groups, technical schools and foremen's clubs, etc., may borrow a print from any Air Reduction office or write to Air Reduction Sales Co., 60 E. 42nd St., New York 17.

POWER TRANSMISSION—The American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, offers four new catalogs covering its line of Wedgbelt (V-belt) drives (Catalog WBC-55-2); speed-reduction drives (SRC-55-2); flat-belt drives (FBC-55-2); and steel conveyor pulleys (CPC-55-2). Each is fully illustrated and contains selection and dimensional information, as well as engineering data, application and operating features.

TECHNICAL DATA—Newly revised catalog of pocket size technical data books for engineers, technical workers, teachers and students is available from Lefax Publishers, Philadelphia 7. In all, over 2,000 subjects are listed, including newly revised material and technical developments covering every phase of engineering.

MATERIALS HANDLING — Phillips Corp., 14 Arch St., Carnegie, Pa., offers a bulletin describing its newest equipment for faster, cheaper and safer materials-handling in coal and other industries. Equipment covered ranges from extra heavy duty trailers with 250,000-lb capacities to motorized transfer cars to skid platforms, and standard and collapsible storage containers, etc. Each is illustrated and described in detail, including capacities and operation.

PUMPS—"Vertical versatility" in the application of Peerless vertical industrial service pumps for liquid transfer from short settings in both industrial and process services is described in new 16-p bulletin. Offered in three basic production designs, Peerless industrial pumps provide capacities from 30 to 40,000 gpm, a head range up to 1,000 ft and a horsepower range with electric motors up to 2,500 hp, with right-angle gear drives up to 400 hp and with steam turbines as required. Bulletin B-505 from Peerless Pump Div., Food Machinery & Chemical Corp., 301 W. Ave. 26, Los Angeles 31, Calif.

SPRING LOCKWASHERS—Booklet, entitled "Spring Lock Washers—Their Engineering Principles," provides a detailed discussion of their design and performance factors, use and advantages for equipment assembly. Available from the Spring Washer Institute, 74 Trinity Pl., New York 6, N. Y.

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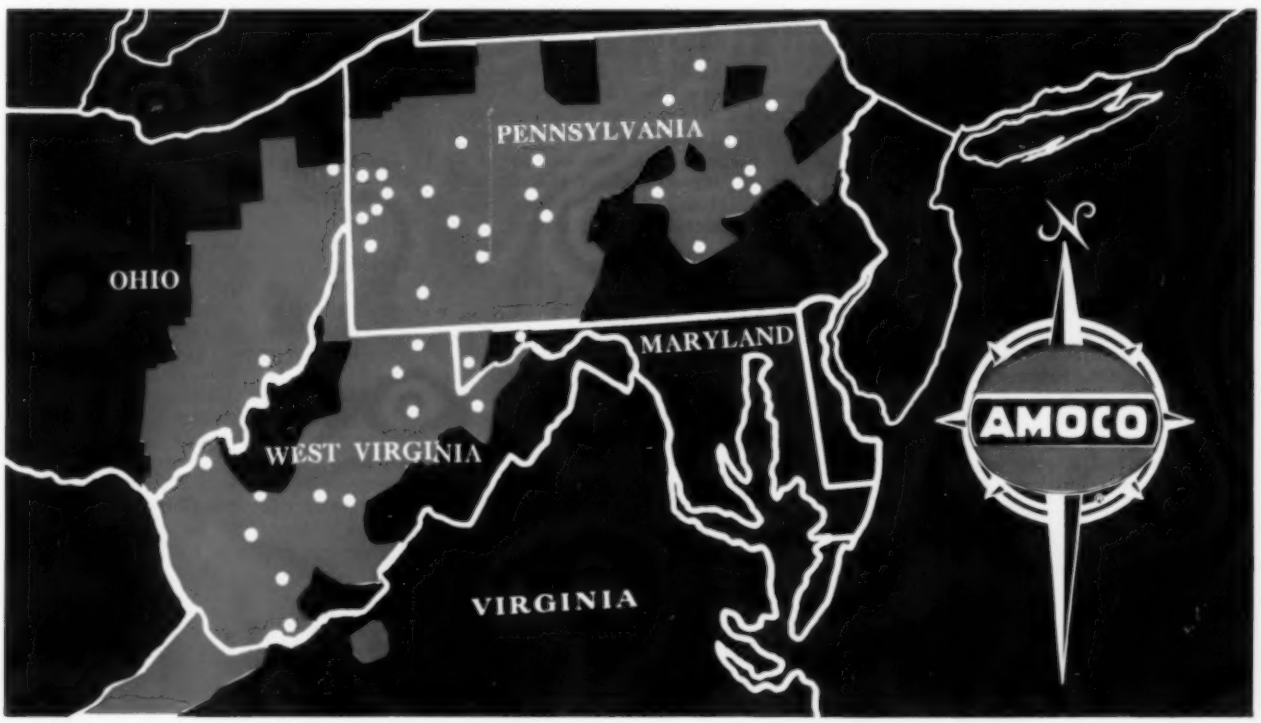

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NEWS ROUND-UP

News Briefs and Trends

Pittsburgh Consol and Freeport Sulphur Launch Potash Project

A joint undertaking to produce potash from a substantial deposit near Carlsbad, N. M., has been announced by Freeport Sulphur Co. and Pittsburgh Consolidation Coal Co. A new company, National Potash Co. has been formed to conduct the operation, according to Langbourne M. Williams and George H. Love, respective presidents of the parent companies. Richard C. Wells, Freeport vice president and controller, will be president of National Potash, and Thomas G. Ferguson, formerly a vice president of one of Pittsburgh Consol's divisions, will be operating vice president.

The project, including mine, plant and related facilities, will call for an estimated capital outlay of $19,000,000. The facilities will be designed to produce potash containing the equivalent of approximately 250,000 tons of potassium oxide per year. Freeport Sulphur Co. is a major producer of sulphur, operating mines in Louisiana and Texas. It is currently producing oil from fields in four states and it also has interests in other minerals. Pittsburgh Consolidation Coal Co., the nation's leading producer of bituminous coal in 1954, will bring to the operation its broad experience in coal mining, in which the same machines and mining technique are employed as in the mining of potash. About 2 yr will be required by National Potash to sink shafts, build a refinery and related facilities, and install a 21-mi water pipe line. Production is scheduled to begin in 1957.

First Recovery Crews Enter Jamison No. 9 Mine

The first rescue crews to explore Jamison No. 9, the Farmington, W. Va., mine wrecked by fire and explosion last Nov. 13, went underground March 14. No immediate attempt was made to recover the bodies of 15 men entombed when the mine was sealed to smother the fires raging below the surface following the explosion. Leading the rescue operation was the crack Jamison crew, captained by Harry Floyd Jr., whose father was one of the entombed men. Following the Jamison crew into the mine was the Hanna Coal Co.'s Dun Glen team of Dun Glen, Ohio, captained by Lewis Jasalusky. From a "fresh-air base headquarters" that has been set up, the two rescue teams intend to search through the depths of the mine. Both of the big mine fans were reported in operation when the rescue was begun, and the methane content of the exhausted air was registered at a little less than 4%. Before the explosion, Jamison No. 9 had been recently acquired by the Pittsburgh Consolidation Coal Co. in its purchase of the Jamison Coal & Coke Co. Modernization of the property had been completed at a cost of several million dollars, and state, federal and company officials were at a loss to account for the disaster.

Zeigler Coal & Coke Acquires Moffat Mine

The Moffat mine of the Moffat Coal Co., Sparta, Ill., was acquired last month by the Zeigler Coal & Coke Co., Chicago, parent company of the Bell & Zoller Coal Co., it was reported March 18. While no details of the transaction were immediately released, it was understood that the arrangements covered all the Moffat holdings, including 4,500 acres of undeveloped coal reserves north and east of the present mine, said to be large enough to insure operation of the property for several decades. Sinking of a new slope was reported to be under consideration by the new management. Present capacity of the mine is said to be 3,800 tpd.

Coal Pipeline Nearer

Amid reports that construction would start in the relatively near future, the annual report of the Pittsburgh Consolidation Coal Co., released in March, noted that "Pipelining of coal has been completed as a Research and Development project and is now in the commercialization stage." Earlier, published reports indicated that construction of the 115-mi line from Georgetown, Ohio, to Cleveland would start in the early spring, though there was no confirmation from Pittsburgh Consol. R. E. DeChant, manager of area development for the Cleveland Electric Illuminating Co., however, stated that he expected that construction contracts would be signed

Mines Bureau Goes to Court On Review Board Decision

The Federal Coal Mine Safety Board of Review's decision in the case of the Princess Elkhorn Coal Co. has been appealed by the U. S. Bureau of Mines through the Justice Dept. to the U. S. Court of Appeals for the 6th Circuit. The Board on Jan. 28, with Member Ferguson dissenting, had upheld the company's appeal from the bureau's gassy classification order arising out of a finding of 0.27% methane in the Princess No. 2 mine. In its appeal to the court, the bureau said that the board erred in holding that the mine atmosphere was not tested by the inspector at a point not less than 12 in from the roof, face or rib, and in holding that the word "face" as it appears in S.203(d) of the Act includes shot coal or loose coal on the floor of the mine; also that the board's findings are not supported by substantial evidence; and that the board erred in annulling the inspector's and director's orders.

In findings on two cases released during March, the Federal Board of Review upheld the USBM's order in one and reversed it in the other. In the case of the Gauley Mountain Coal Co., the board March 16 upheld the bureau's closure order for lack of inspection of certain areas in the Williams River No. 1 mine considered as gassy under the code by reason of a prior gassy classification made by the state mines department. In the case of the Cassity mine of the Three Fork Coal Co., Inc., the board March 4 annulled the bureau's closure order issued because of accumulations of machine cuttings, holding that the bureau had failed to prove its case.

Oil, Gas and Coal

For the complete text of the Cabinet "Report on Energy Supplies and Resources Policy," including recommendations for exempting natural gas production from federal control, banning sales below cost, restricting oil imports and reducing freight rates, as well as for comments and late developments on the legislative front, see p 84-88 of this issue.

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in March or April. He also stated that the line would carry 8,000 tons of coal a day.

Riverlake Belt Fought

A third attempt to obtain condemnation rights to permit the construction of a coal-and ore-carrying belt system from E. Liverpool, on the Ohio River, to Cleveland was meeting heavy going in March before the House Commerce and Transportation Committee of the Ohio legislature. Sponsor of the project is Riverlake Belt Conveyors, Inc., a subsidiary of the Akron, Canton & Youngstown R.R. Cost of the line is estimated at $300 million, and it would consist of a 48-in southbound belt, 3,900 tph, for ore, and a 72-in northbound belt, 4,000 tph, for coal.

Spearhead of the attack on the proposal is the Ohio Railroad Association, representing the Baltimore & Ohio, Chesapeake & Ohio, Erie, New York Central, Nickel Plate, Pennsylvania and others. The association began presenting its case Feb. 22, and in the course of the hearings, which extended into March, was joined by representatives of the railroad brotherhoods, and by miners' union and coal operator witnesses from Ohio. Both Arnold Lamm, executive vice president, Sunnyhill Coal Co., and Adolf Pacifico, president, District 6, UMWA, foresaw heavy damage to the Ohio coal-mining industry if the belt idea was approved.

Wyoming Gas Explosion Initiated by Electric Arc

A gas explosion in the Wyoming mine of the Red Jacket Coal Corp., Wyoming, W. Va., Jan. 28, which killed two men and injured five others was caused "By an electric arc igniting an undetected accumulation of explosive gas," according to the U. S. Bureau of Mines report on the post-explosion investigation, carried out with officials of the company and of the West Virginia Department of Mines. According to the report, "the arc was created in the electrical compartments of the permissible-type loading machine or permissible-type shuttle car, neither of which was maintained in permissible condition."

Peabody Resigns

Stuyvesant Peabody has resigned as chairman and a director of Peabody Coal Co., the largest coal producer in Illinois, which was founded by his grandfather, Francis S., in 1883. According to reports, his resignation resulted from disagreement with other executives and directors over major managerial policies of the company. He also differed with the majority of the company's board over future operations and in particular with the opening of a new slope mine in southern Illinois which he believed could not compete with existing strip mines.

Lehigh Valley Improvements

The Lehigh Valley Coal Co. has announced plans for improvements costing over $100,000 at the Henry colliery, in Plains, and at the Dorrance mine, Wilkes-Barre, Pa., to reduce operating costs. Improvements at Henry will include changes in the shaft head frame for centralization of coal-handling facilities. Mechanical mining methods at low capital cost will be re-introduced at Dorrance. H. W. Bradbury, executive vice president, said the company's future lies in obtaining a large share of the anthracite market and efforts have been made to find new business opportunities for corporate investment.

MEETINGS

Bituminous Coal Research, Inc.: Annual Meeting, April 13, William Penn Hotel, Pittsburgh, Pa.

American Mining Congress. Coal Convention and Exposition, May 16-19, Cleveland, Ohio.

Rocky Mountain Coal Mining Institute: 51st Annual Meeting, June 26-29, Colorado Hotel, Glenwood Springs, Colo.

Large Coal Plant Planned By Utah Construction Co.

The construction of a large central power plant is being planned by the Utah Construction Co., which holds a prospecting permit and lease covering coal lands in the eastern portion of the Navajo Reservation, Fruitland area of Colorado. A. D. Christensen, president and general manager of Utah Construction, said that the actual size of the plant will be dependent upon ultimate users and the needs of ultimate major consumers. He also stated that Utah has investigated and drilled the coal reserve to confirm tonnages available for development of low-cost thermal power. According to Ken Garard, tribal engineer, the company is "finding good coal and lots of it."

Pitt Consol Planning New West Virginia Property

Plans for the opening of a new mine and preparation plant were announced by the Pittsburgh Consolidation Coal Co. in its annual report to stockholders released March 15. In discussing the improvement of properties, the report said: "The one large new development will be the opening of a new outlet from our large reserves in Monongalia County, West Virginia, to the Monongalia River and the construction of a new coal preparation plant there. This undertaking is in keeping with the company's practice of providing, wherever possible, highest quality coal for shipment by either rail or river. Work on this project is just beginning and the plant should be completed in about 2 yr." Engineering plans and specifications for the new property have not yet been completed and no further details are as yet available on the project, according to company officials. In its annual report, Pittsburgh Consol also announced that the new Glen Castle mine of its Hanna Coal Co. Div. is nearing the date when it will attain its full production of 4,000 tpd and that construction of the new gigantic stripping shovel for Hanna is making good progress. The shovel is expected to be completed and in operation by the latter part of this year. Capital expenditures were $8,595,000 during 1954, bringing to $107 million the total spent by Pittsburgh Consol during the period from 1946 to 1954, the report indicated.

Gorgas Tonnage Larger

Total 1954 output of the Gorgas (Ala.) mine of the Alabama Power Co. was 998,478 tons instead of 992,038 tons as listed in "The 50 Biggest Mines in 1954," March *Coal Age*, p 80, reports Milton H. Fies, vice president-coal operations, for Alabama Power Co. The discrepancy of 6,440 tons is believed to have resulted from the fact that the data supplied *Keystone Coal Buyers' Manual*, a *Coal Age* affiliate which prepared the tabulation, did not include the tonnage produced at a new drift developed in 1954. The property's official output, as reported to state and federal agencies, of course includes this tonnage.

King Rejected as Mines Chief by W. Va. Senate

The West Virginia Senate March 12 denied confirmation of the appointment of Frank B. King as chief of the state Department of Mines. At the time of the action, Mr. King was directing preparations for recovery operations at Jamison No. 9, the Farmington, W. Va., mine wrecked by fire and explosion Nov. 13. Whatever reasons the senate had for rejecting Mr. King, they were apparently unknown to local producers and UMWA officials who esteemed his work in handling the Jamison mine explosion, the only major disaster occurring during his term. Formerly administrative assistant to the head of the department Mr. King was appointed to a 4-yr term as mines chief Jan. 1, 1954.

Atomic Power for North Central Fla. to be Studied

The Atomic Energy Comm ssion March 14 approved the study of commercial atomic power for north central Florida, one of the nation's highest fuel-cost areas. The new power study will be made by the Seminole Electric Cooperative, Inc., a combine of five electric cooperatives with headquarters at Madison, Fla. The object of the year-long study will be to determine the suitability of small atomic power plants with a 10,000-w capacity for use by members.

Ask Transport Tax Repeal

Repeal of the 4% transportation tax on coal is asked in a bill filed in the 84th Congress Feb. 7, by Representative Flood, Pennsylvania. Specifically, the bill would repeal Sec. 4271 (b), Internal Revenue Code of 1954; also Sec. 4271 (c), relating to coal previously taxed.

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OWNER: Peel Tree Mine, Clarksburg, W. Va.

INSTALLATION: GM "4-71" Diesel powers 42" McCarthy Coal Recovery Drill built by Salem Tool Company, Salem, Ohio.

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Coash Succeeds Staehle as Coal Age Publisher

CARL J. COASH (left) has been named publisher of *Coal Age, Engineering & Mining Journal* and affiliated mining publications, effective April 1. He succeeds Alfred M. Staehle (right), publisher for the past 12 yr, who asked to be relieved of the mining papers so as to devote his full time to his duties as publisher of *Factory Management & Maintenance*, another McGraw-Hill publication.

Mr. Coash first joined McGraw-Hill in 1944 as district manager in the St. Louis area for the mining papers and *Factory*. In January, 1947, he became Chicago district manager for the mining publications and since April 1, 1953, has served as advertising sales manager of *Coal Age, E&MJ* and affiliates, with headquarters in New York. Following graduation from the University of Illinois in 1928, Mr. Coash served the state of Illinois as an inspector of engineering and highway construction. Later he joined the F. W. Dodge Corp. and was St. Louis manager of that firm's Sweet's Catalog for 5 yr before coming to McGraw-Hill.

One of McGraw-Hill's senior publishing executives, Mr. Staehle was graduated from Carnegie Institute of Technology in 1917. Following 6 yr with Westinghouse Electric Corp., he joined McGraw-Hill in 1926 and held various posts on publications, specializing in the mining and construction fields before his appointment as manager of *Factory* in 1933. He was assigned the additional responsibilities as publisher of the mining publications in 1942. As publisher of *Coal Age*, with over-all responsibility for the editorial and advertising operations, Mr. Staehle has taken an active interest in the coal industry's problems and is credited with many of the policies for improvement of *Coal Age's* service to readers put into effect during this period.

Connelly to Direct Pa. Mine-Drainage Program

State Mine Inspector Daniel H. Connelly, of Kingston, Pa., has been appointed a Pennsylvania Deputy Secretary of Mines. In his new post, Mr. Connelly will be in complete charge of the proposed federal-state anthracite mine-drainage program. At the present time, almost identical bills are pending in the state legislature at Harrisburg and in Congress at Washington to cover the costs of the program. The bills call for the federal government putting up $8,500,000 and Pennsylvania matching this with an equal sum. The Pennsylvania House passed the state bill Feb. 28 by a vote of 203 to 4, and sent it to the Senate for further action.

Coal Wage Hearings Concluded

Hearings on a minimum wage determination for the bituminous coal industry were concluded Feb. 26. All interested parties were given 2 wk from the date the transcript of the hearing is available to file briefs with the Labor Department Examiner, Clifford Grant, who will then forward the entire record to Secretary of Labor Mitchell for his consideration and final determination. The hearing was initiated by Secretary of Labor Mitchell in response to requests from John L. Lewis, president of the UMWA; George H. Love, president, Pittsburgh Consolidation Coal Co.; and A. R. Matthews, president, Pocahontas Fuel Co., Inc. (*Coal Age*, March, 1955, p 120). Primary target of the action is the Tennessee Valley Authority, which has been charged with depressing the industry in general by purchasing coal from mines operating with substandard wage scales and safety conditions.

British Miners Get More Pay

The National Coal Board and the National Union of Mineworkers agreed March 15 on proposals for partial reorganization of the British mining wage structure. Nearly all the 380,000 day-wage men who work at the pits will receive an increase of 11s 6d a week in April, thereby raising the minimum wage from £7 15s to £8 6s 6d underground and from £6 15s to £7 6s 6d on the surface. The new grade rates are intended to provide greater uniformity in the payments made for various jobs in different districts. It is estimated that the wage increases will cost approximately £13 million a year. Discussions are continuing on the revision of other parts of the wage structure, including piece-workers and task-workers.

Coal to Move up Missouri

The first regular movement of coal up the Missouri River will begin in the near future, it was announced March 18 when Federal Barge Lines, St. Louis, published rates from Illinois and Kentucky railheads to the new Chamois, Mo., power plant of the Central Electric Power Cooperative, Jefferson City, Mo. A barge unloading dock now under construction at the power plant, 20 mi east of Jefferson City on the Missouri River, is expected to be in operation by the end of May. At that time, Federal Barge Lines will begin delivering coal in barge-loads from the central Illinois coal field railhead at Alton, Ill., the southern Illinois mines railhead at Ford, Ill., and the western Kentucky railhead at Grand River, Ky.

Coal Washing up in Australia

First privately-owned coal washing plant is now operating in the state of New South Wales, Australia, and two other plants are nearing completion in what is officially described as a boom for coal washing plants in Australia. The first three privately-owned plants will cost about $2 million and several additional contracts have been, or are about to be, concluded. The boom is caused by an increasingly competitive fuel market in Australia, and by overseas and Australian demand for higher grades of coal. It is expected that the total cost of construction of several planned coal washing plants will amount to several million dollars. The "heavy-medium" type of plant seems to be the most popular, according to reports, although at least one plant will use the jigging shaker screen and others are studying the virtues of this type of plant.

Compass Coal Tunes Up New Preparation Plant

Latest in an expansion and modernization program begun by the parent Pittston Co. in 1945, the new Compass No. 2 preparation plant was put through a series of preliminary tests March 21. The 300-tph plant is scheduled to be operating at full capacity by April 4, washing, drying and sizing Pittsburgh-seam coal for industrial and utility customers. Completion of the plant marks the $30 million point in Pittston's plan to spend $50 million on new developments and improvements. With the new preparation facilities, Compass management expects to increase the heating value of the coal by 400 Btu, reduce the sulphur in the coarse coal by 1% and in the fines by 2%. Features of the plant include a Chance cone for washing coarse coal, Deister Concentrator tables for cleaning fines, CMI and Humboldt cen-

Continued on p 148

ANOTHER

FAIRMONT PREPARATION PLANT

Fairmont-built plant processing 210 TPH of 7" x ⅛" No. 4 Pocahontas coal for the Gulf Smokeless Coal Co. at Tams, W. Va.

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Subsidy Held Unwise For Nuclear Power

When modern coal plants will produce electricity for as little as 3 mills per kilowatt-hour, it would be "poor management" to subsidize commercial and industrial atomic energy plants whose ultimate goal is nuclear power costing 4 to 7 mills per kilowatt-hour. The National Coal Association's position was thus stated to Congress Feb. 28 by Brice O'Brien, assistant counsel. He was accompanied by Dr. Ford K. Edwards, director of the Department of Coal Economics.

Mr. O'Brien pointed to the increasing efficiency in the utilization of coal for the production of electricity. In 1920, he said, it required an average of 3 lb of coal to produce 1 kw-hr of electricity but, by November 1954, the average was down to 0.97 lb and the trend is still down.

The national interest further dictates against government subsidy of nuclear power plants because "in contrast to the practically unlimited supplies of coal, it appears we have a very limited supply of nuclear fuel in quantities which permit its utilization." Also, Mr. O'Brien emphasized that "sabotage of coal-fired steam plants does not represent any particular danger, but sabotage of nuclear power plants presents an obvious and alarming danger in time of war."

Large Attendance For 1955 AMC Coal Show

A large turnout of mining men from all parts of the country for the 1955 Coal Show of the American Mining Congress is indicated by the heavy requests for hotel reservations, the AMC reported last month. Over 225 manufacturers of mining equipment and supplies will be represented by displays of products for every phase of deep and strip mining at the 4-day Convention and Exposition to be held in the Cleveland Public Auditorium May 16-19.

The numerous Convention sessions will cover a broad range of coal mining progress and problems in operating methods and equipment and will feature papers and discussion by top industry leaders. The comprehensive program was developed by the AMC Program Committee, chairmaned by Hugh B. Lee, president, Maumee Collieries Co.

Hotel reservations are being handled through the Cleveland Housing Bureau, 511 Terminal Tower, Cleveland, Ohio, and those still needing accommodations should apply direct to the bureau without delay, the AMC points out.

Full details of the Convention program and a "Pre-Convention" report on the varied products to be exhibited by manufacturers will be published in May Coal Age as a service to readers planning to attend the Coal Show.—Editors Note.

Glen Alden Plans Mine Improvements

Plans for the expenditure of an additional $3,000,000 in modernization of production facilities in 1955 and 1956 were announced by Francis O. Case, president, Glen Alden Coal Co., in a report to stockholders and supervisory employees in February. This is in addition to $2,600,000 already spent for machine mining and breaker modernization in 1954. The results of these and other steps were summarized by Mr. Case as follows:

"Overhead, expenses, mining and sales costs have been drastically reduced. Mining and preparation costs were reduced during the last 2 yr by approximately 20%. Overhead items were eliminated or reduced in cost by approximately the same amount. Overall, our efforts to reduce costs have more than offset the negative factors, and in 1954 we earned a profit after all charges for the first time in 3 yr." This profit was $181,843, compared to a loss of $4,934,481 in 1953. "This improvement in our operating performance has continued to date in 1955 and we have every reason to believe that the future will bring further improvement."

7,000 Safety Inspections

More than 7,000 safety inspections of the larger coal mines were made by federal men in the fiscal year ended June 30, 1954, the Bureau of Mines reports in its annual summary of activities. In making the inspections and carrying out their duties under the Federal Coal Mine Safety Act, the inspectors found it necessary to issue 159 orders requiring the withdrawal of men from all or part of 93 mines until hazardous conditions were corrected.

Other safety activities included revision of the Federal Mine Safety Code for Bituminous Coal and Lignite Mines and issuance of a Federal Mine Safety Code for Anthracite Mines. During the year, also, the bureau trained nearly 17,000 men in coal-mine accident prevention, and 37,971 in first aid and mine rescue.

In coal utilization and research, the bureau noted that a large Texas power plant had begun the use of a bureau-developed process for the production of by-product tars and light oils, as well as char for boiler use. Studies of the properties and uses of tars and oils were continued by the industry and the bureau, along with other research, including tests of newly designed equipment to increase underground recovery of both bituminous and anthracite. The bureau also began the development of a new experimental mine for studies in the control of airborne dusts.

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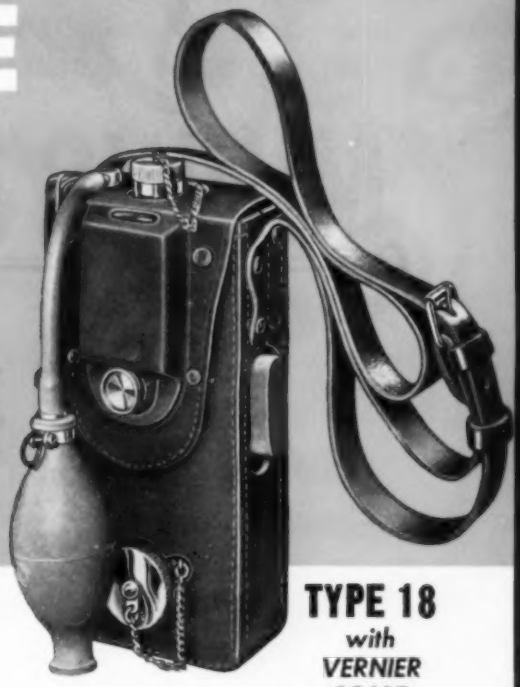

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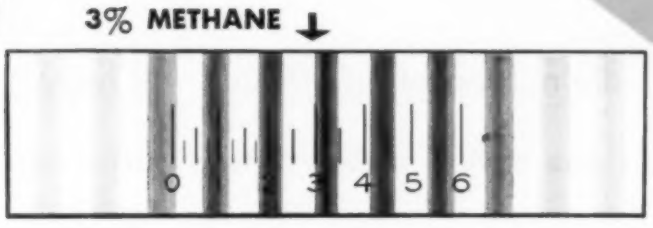

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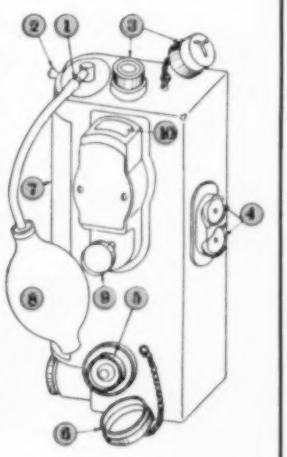
5. Zero-adjusting knob for setting interference fringe to zero position in fresh air.
6. Screw-on cover to protect zero setting from disturbance during tests.
7. Snap-on lid covers replaceable moisture-absorbent cartridge and single cell flashlight battery.
8. Aspirator bulb.
9. Vernier scale adjustment knob.
10. Vernier scale.



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Coal Age in September

MINING GUIDEBOOK AND

. . . a *new* COAL AGE

For the first time, coal mining operating officials will have in one place, under one cover, fundamental information on every phase of mining. *What's being done* to cut costs, raise product quality and promote safety.

***Why it's being done* and *how* it's accomplished.**

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presents the

BUYING DIRECTORY ISSUE

reader service

And, in addition, a BUYING DIRECTORY of equipment, services and materials generally used by the coal mining industry. Arranged by products and including trade names, manufacturers names and addresses, the BUYING DIRECTORY will help COAL AGE readers quickly locate sources of supplies. It will be in the same issue, under the same cover.

And there will be a reference to all advertising pages in the product listing to help COAL AGE readers obtain more detailed information on products or services.

The COAL AGE MINING GUIDEBOOK AND BUYING DIRECTORY issue will be mailed to COAL AGE subscribers, automatically, as a new additional subscription service. Plan now to receive your personal copy in September.

GENERAL INDEX

THE COAL AGE MINING GUIDEBOOK and BUYING DIRECTORY ISSUE

Personal Notes

John B. Farquharson has been appointed general superintendent of the Mercer and Wyoming County mines of the American Coal Co. of Allegany County, McComas, W. Va., according to an announcement by Henry F. Warden, president. Mr. Farquharson took over his new duties March 1, after having been chief engineer since Oct. 1, 1952, when he succeeded **Henry W. Saunders.** Mr. Farquharson was born in Scotland Aug. 25, 1896, and started in the Langraff (W. Va.) mines of the Empire Coal and Coke Co. in 1910. He attended Teachers' College from 1913 to 1914, received the degree of mining engineer from West Virginia University in 1919, and returned to the industry as engineer for the Flo Mining Co., Kermit, W. Va., in 1921. He joined the Mill Creek Coal & Coke Co. as engineer in 1926, and became superintendent of the American Coal Co.'s Piedmont mine in 1936, transferring to become superintendent of the Deerfield mine in 1947.

Retirement of **J. W. Hurley** as vice president in charge of production for the C. H. Mead Coal Co. and Red Parrot Coal Co., divisions of the North American Coal & Dock Co., a subsidiary of the North American Coal Corp., has been followed by several new appointments in the division. Mr. Hurley's mining career began nearly 40 years ago, when he became a trapper for the Mohawk Coal & Coke Co., Mohawk, W. Va. He held a number of mining posts until 1933, when he became superintendent for the Welch Pocahontas Coal Co. He became safety director for Red Parrot in 1941, superintendent of the Red Cedar mine in 1951, general superintendent for C. H. Mead in 1951, and vice president in charge of production in November, 1953. The new appointments are:

R. A. Maurer, formerly superintendent, C. H. Mead Coal Co., to general manager of the West Virginia properties of North American. A veteran of 11 yr, Mr. Maurer started in eastern Ohio, then taking a degree as mining engineer at West Virginia University. After graduation, he went with the Consolidation Coal Co. (W. Va.), advancing to assistant superintendent of the Osage mine before joining the North American organization, first as assistant to the president, before becoming superintendent for C. H. Mead.

J. H. Hurley, from acting superintendent to superintendent, C. H. Mead mines, East Gulf, W. Va. Mr. Hurley entered the mining industry as an employee of the Keystone mine, Eastern Gas & Fuel Associates, 9 yr ago. He then attended West Virginia University and served a hitch in the service before going with Red Parrot in various capacities, then to North American's Powhatan Point (Ohio) properties as assistant manager of industrial engineering, and then to C. H. Mead as general mechanization foreman.

H. D. Caldwell, from general mine foreman to superintendent, Red Cedar mine, Prenter, W. Va. Mr. Caldwell started with the Carbon Fuel Co. in 1922 as a miner and working in various capacities for this company and the American Eagel Collieries until 1938, when he became foreman of the Red Parrot No. 5 mine. He then became general night foreman and next general day foreman, transferring to Red Cedar in 1954.

J. A. Gothot, from chief engineer to superintendent, No. 5 mine, Red Parrot. Mr. Gothot's first mining position was with the engineering staff of the Hanna Coal Co. in 1935. In 1941, after studying engineering in Ohio State Extension Classes, he became engineer for North American's Betsy mine, Smothfield, Ohio, 1941 to 1949, with 3½ yr out for Pacific service. In 1949, he transferred to Red Parrot as chief engineer.

S. Austin Caperton, chief engineer, has been appointed superintendent of the Gaston No. 2 mine, Slab Fork Coal Co., Alpoca, W. Va., succeeding George W. Dove, retired. Mr. Caperton, who received his mining degree from Virginia Polytechnic Institute in 1950, was first employed in the Slab Fork engineering department, succeeding Stewart L. Deck when Mr. Deck was appointed superintendent of Brooklyn mine in 1953. Mr. Caperton will continue as chief engineer along with his new duties.

Robert B. Anderson, has been made superintendent of the Gary No. 2 mine, U. S. Steel Corp., Gary, W. Va., according to an announcement March 3 by Lloyd M. Lineberry, district superintendent. Mr. Anderson, a VPI graduate in mining, also received an electrical degree after a period in the service. He started in mining with the Inland Steel Co., Wheelwright, Ky., then became industrial engineer for the Tennessee Coal, Iron & R. R. Co., resigning in 1951 to become industrial engineer with the Imperial Smokeless Coal Co., Quinwood, W. Va. He rejoined U. S. Steel as assistant superintendent of Gary No. 2 in 1951.

Robert Baugh, formerly at the company's Itmann mine as assistant superintendent, and previously, from 1949 to 1954, general mine foreman at Bishop, Va., has been promoted to superintendent of the Amonate (Va.) mine of the Pocahontas Fuel Co., Inc.

H. B. Salkeld has been elected chairman of the board of the Tasa Coal Co., Pittsburgh, Pa. **Preston H. Vestal,** formerly executive vice president, has been elected president of the company to succeed Mr. Salkeld. In making the announcement, the company also reported that the new washer at its Peerless mine, Summersville, W. Va., is now in operation. The washer is a Belknap calcium-chloride double-jig unit with a capacity of 230 tph. The mine has produced over 200,000 tons since opening Nov. 1.

Raleigh Joins Coal Age

WILLIAM A. RALEIGH JR. has joined the editorial staff of *Coal Age* as an assistant editor. He will write feature articles and handle general news reporting assignments on economic and technical matters of interest to the coal industry. For the past 4 yr, Mr. Raleigh has been associated with Battelle Institute, Columbus, Ohio, where he specialized in preparing articles and news releases on a wide variety of subjects in science and technology. Before Battelle, Mr. Raleigh worked in several editorial and sales promotion capacities for the export trade magazines of the McGraw-Hill International Corp. He served in the U. S. Navy Reserve for 3½ yr during World War II, and was graduated from Yale in 1939 as a major in economics.

A. W. Vogtle, vice president and sales manager of the DeBardeleben Coal Corp., Birmingham, Ala., has been elected secretary and a member of the board of directors of the corporation, in addition to his present duties.

R. E. Snoberger resigned for reasons of health as president and member of the executive committee of the Truax-Traer Coal Co., Chicago, at a regular meeting of the company's board held March 23. He will continue on the board of directors and will handle special assignments on a part-time basis as assistant to the chairman. **A. H. Traux,** board chairman, assumes the duties of president. Formerly executive vice president, Mr. Snoberger was elected company president July 31, 1952. He also served as president of the Binkley Coal Co., which merged with Truax-Traer in 1950.

Gordon E. Smith, formerly with the Pennsylvania state Department of Mines, has joined the Gilberton Coal Co., Gilberton, Pa., as general manager.

James Shover, Lansford, Pa., formerly state mine inspector, has been appointed deputy secretary, Pennsylvania Depart-

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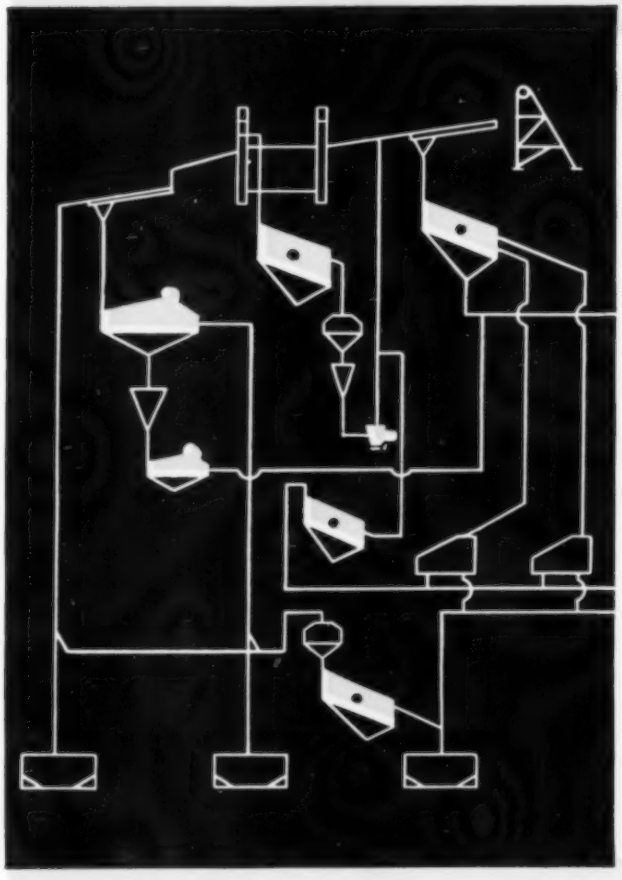

- for sizing ROM coal.
- for dry sizing raw coal ahead of cleaning units.
- for sizing and dewatering coarse coal after cleaning units.
- for sizing moist fine coal.
- for wet sizing raw coal ahead of cleaning units.
- for dewatering refuse after cleaning units.
- for media recovery after heavy media cleaning units.
- for dewatering fine coal after cleaning units.
- for sizing washed and crushed coal.
- for dewatering sludge — solids recovery.
- for sizing fine coal after dry cleaning units.

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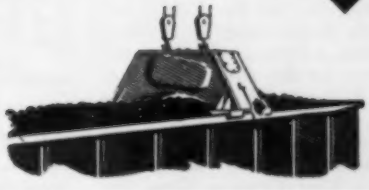


ment of Mines, it was announced March 10 by Joseph Kennedy, Mines' Secretary.

Glen Alden Coal Co., late in February, announced four appointments to various operating service posts, as follows: **John M. Swales,** assistant general superintendent of mining operations; **Thomas E. Davis,** assistant superintendent of power and mine services; **D. J. Krauser,** assistant construction engineer; and **A. R. Goeppert,** assistant mining engineer.

Mr. Swales, a Penn State graduate in chemistry and physics, came to Glen Alden in 1939. After government service and employment with the Pennsylvania Salt Mfg. Co., he returned to Glen Alden as assistant superintendent of the Nanticoke power plant, moving up to become assistant superintendent of the company's Wanamie colliery. Mr. Davis, who served in the Navy during World War II, joined Glen Alden in 1946, then taking a degree at Lehigh in 1950 before returning to Glen Alden as a laborer, rising to the position of mine foreman. Mr. Goeppert, also a Lehigh graduate with a mining degree in 1949 joined the Glen Alden engineering department in that year. Earlier, he was employed by the Kaiser Co. before an Army hitch. Mr. Krauser, who served in the Signal Corps and attended Kings College and Notre Dame, receiving an engineering degree in 1950, came to Glen Alden from the Bethlehem Steel Co.

Charles B. Tillson Jr. has been named general superintendent of the company's mine at Crucible, Pa., George E. Muns, manager, Fuel Div., Crucible Steel Co. of America, announced March 15. Mine superintendent since 1953, Mr. Tillson will continue in charge of all mine operations, adding to his duties the general supervision of Crucible's Cumberland Supply Div. Appointed mine superintendent to succeed Mr. Tillson was A. V. Faull, formerly general superintendent, Wyatt Coal Co. Previously, Mr. Faull had been associated with the Oneida Coal Co., Butler Consolidated Coal Co., EG&FA and the USBM, and also served 2 yr on the labor arbitration board of the Kanawha Coal Operators' Association while employed in the Charleston, W. Va., area. U. P. Rembold, general foreman of the cleaning plant since its completion in 1944, has been appointed superintendent, coal preparation. Earl N. Burnham, who also assisted in construction of the cleaning plant and joined the company following its completion, has been made general foreman, coal preparation. He has served as outside foreman since 1951.

Edward C. Carris, associated with Roberts & Schaefer for the past 7 yr., has resigned to open a new consulting mining engineering agency at 626 Broad St., Charleston, W. Va. Mr. Carris' first job was with Strawbridge & Clothier, in Philadelphia, following which, he became engineer for the Houston Coal & Coke Co., Elkhorn, W. Va. He then occupied a similar position with the American Coal Co. of Allegany County, and later became general manager of the American Coal Cleaning Corp. Before joining Roberts & Schaefer, he was director of preparation for the Island Creek Coal Co. and its subsidiaries.

Bernard A. Moser, former chief engineer, Wilmot Engineering Co., White Haven, Pa., has joined the staff of Wilferd L. Roller, consulting metallurgical engineer, as design engineer, with headquarters at Pottsville, Pa.

Association Activities

Ky. Reclamation Group Meets

At the annual stockholders and directors' meeting of the Kentucky Reclamation Association held March 8 at the KRA office in Earlington, Ky., directors were elected for the coming year, as follows: Jesse R. Williams, association president; O. E. May, vice president; Robert Donaldson, secretary-treasurer; James Deane, Edwin Ruby, H. R. Duncan, William Maglinger, and James E. Miner.

Hazard Operators Appoint

Tom Crutchfield, Hazard, Ky., formerly associated with the Blue Diamond Coal Co., has been appointed executive secretary of the Hazard Coal Operators' Association, effective April 1.

Big Sandy-Elkhorn Elects, Names Safety Winners

Irvin C. Spotte, general superintendent, Princess Elkhorn Coal Co., was elected president of the Big Sandy-Elkhorn Coal Mining Institute Feb. 26, succeeding James Fleming, of the Elk Horn Coal Corp. The election preceded the institute's annual ladies night and dinner held in Wheelwright, Ky. J. H. Mosgrove, institute secretary, announced the 1954 winners of the organization's annual competition for the two classes of mines with the best safety records. The Class A award (for larger operations) was won by the Hendrix mine of the Consolidation Coal Co. (Ky.); while the Class B award went to the Puncheon Creek mine of the Utilities Elkhorn Coal Co., which has operated 4 yr without a lost-time injury.

Elected vice presidents of the institute were: Harry Zimmerman, Inland Steel Co.; Claude Brown, Republic Steel Corp.; and M. B. Bentley, Consolidation Coal Co. (Ky.). Named directors were: M. E. Prunty and R. C. Collier, Consol (Ky.); A. M. Ayers and Elmer Queen, Russell Fork Coal Co.; Arthur Bradbury, Inland Steel Co.; M. K. and Ward L. Reed, Turner Elkhorn Coal Co.; James Fleming and Noah D. Howard, Elk Horn Coal Corp.; John L. Coyer, Republic Steel; M. M. McCormick, Pond Creek Pocahontas Coal Co.; C. L. Sherman, Stephens Elkhorn Fuel Corp.; B. F. Fish, South East Coal Co.; Ray Spears, Princess Elkhorn Coal Co.; and George E. Evans Jr., Glo Valley Coal Corp.

Kanawha Valley Institute Names New President

H. A. Jones, general superintendent, Carbon Fuel Co., Carbon, W. Va., has been elected president of the Kanawha Valley Mining Institute. Other newly elected officers include: first vice president, M. L. Alley, general manager, Gauley Mountain Coal Co.; second vice president, C. V. Hunt, general superintendent, Semet-Solvay Div.; third vice president, H. M. Tibbs, superintendent, W. Va. Div., Truax-Traer Coal Co.; secretary, Maj. A. W. Fleugel; treasurer, William Buchanan, vice president, Montgomery National Bank; and assistant treasurer, Roy S. Long, president, Riverton Coal Co.

Heads Fuel Credit Men

Stuart Kritzky, secretary-treasurer of the Nashville Coal Co., Inc., Nashville, Tenn., has been elected president of the National Fuel Credit Association. He succeeds W. P. Chamberlain, credit manager of the Cleveland-Cliffs Iron Co., who resigned Jan. 1 following his company's disposal of its coal department.

Obituaries

THOMAS C. CHEASLEY

Thomas C. Cheasley, 65, vice president of the Sinclair Coal Co., Kansas City, Mo., died March 17 at his winter home in Fort Lauderdale, Fla. Mr. Cheasley had been prominently identified with the bituminous coal industry for many years and had been active in many industry committees and projects. He had long been interested in land restoration and conservation, and at the time of his death was active on the Land and Water Use Advisory Committee of the National Coal Association and also was a member of the Natural Resources Committee of the United States Chamber of Commerce.

George W. Creech, 64, well-known Kentucky operator, died March 9 in a Knoxville, Tenn., hospital. A native of Bell County, Kentucky, and active in coal mining for most of his career, Mr. Creech was vice president of the Creech Coal Co., Twila, Harlan County, Ky., and a member of the board of directors of the Randal Fuel Co., Atlanta, Ga.

E. E. Gaston, chief electrical engineer, Hanna Coal Co., St. Clairsville, Ohio,

was instantaneously killed Feb. 27 when he accidentally touched a high-tension line. Mr. Gaston was widely known in engineering circles and was the author of numerous articles.

John T. Jones, 66, a UMWA official for many years, died March 3 in a Washington, D. S., hospital, following an operation. Mr. Jones had been a member of the union's international executive board since 1942 and a director of the Labor's Nonpartisan League since 1940. At the time of his death he was president of the UMWA District 16.

George W. Jones, 63, chief of the USBM Gas Explosions Branch, Pittsburgh, Pa., died March 4. Mr. Jones joined the bureau as a junior chemist March 27, 1915, a year after his graduation from the University of Denver, and devoted his entire career to studying the hazards of combustible materials and the effective means of preventing explosions. Recognized as a leading American authority on gas explosions, Mr. Jones had been chairman of the Committee on Hazardous Chemicals and Explosives of the American Chemical Society for 17 yr prior to his death.

New Books for Coal Men

Excavators' Workbook

Moving the Earth, by Herbert L. Nichols Jr., is a 1,280-p reference book for the excavating industry, including information on equipment and methods for successful strip mining. Written in "how-to-do-it" style, with 1,264 illustrations, the book treats subjects such as land clearing and job layout, soil characteristics, drainage, landscaping and grading, blasting and tunneling, pit operation and business methods for the excavating industry. In a second major subdivision, the book deals with the design, operation and characteristics of practically all types of excavating machinery and the associated haulage units and finishing machines such as graders and compactors. *$15.00. North Castle Books, 212 Bedford Rd., Greenwich, Conn. Fabrikoid binding.*

Permissible Mine Equipment

Permissible Mine Equipment Approved to Jan. 1, 1953, by H. B. Brunot. A revised list of permissible equipment with an appended list of available flame-lamp fuels and manufacturers of flame-resistant trailing cables. *Bulletin 543. 33 pp. 8x10½-in; paper. 25¢, Superintendent of Documents, Government Printing Office, Washington 25, D.C.*

Coal Analyses from 22 States

Analyses of Tipple and Delivered Samples of Coal (Collected during the Fiscal Year 1953), by S. J. Aresco, C. P. Haller and R. F. Abernathy. Analyses of 11,435 samples of coal collected at mine tipples and from shipments to Federal departments and institutions. *Report of Investigation 5085. U. S. Bureau of Mines, Publication Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Coal Dictionary

Coal and Bitumens and Related Fossil Carbonaceous Substances: Nomenclature and Classification, by S. I. Tomkeieff, reader in mineralogy, King's College, University of Durham, Newcastle upon Tyne, England. Names and definitions of terms for coal and related substances, including common German and French terms, comprise the major part of this text, and are supplemented by a brief discussion of the classification of carbonaceous substances. *122 pp; 5x7¾; Cloth. Price, £0.17.6, Pergamon Press, Ltd., 242 Marylebone Rd., London N. W. 1, England.*

UMW and Coal

The Union and the Coal Industry, by Morton S. Baratz, instructor in economics, Yale University. Latest in the long list of publications attempting to explain how Lewis and the UMWA operate and how their activities have affected the coal industry, this book has as its text the impact of an aggressive labor organization on a highly competitive industry. Major conclusion: "The clear implication emerges that no positive case can be made for or against unionism on economic grounds. This suggests that efforts to control union activities must be directed more against the political rather than the economic effects of unions." *170 pp; 6¾x9; cloth. Price $3.75, Yale University Press, New Haven, Conn.*

EQUIPMENT APPROVALS

Nine approvals of permissible equipment were issued by the U.S. Bureau of Mines in February, as follows:

The Long Co.—Conveyor power unit; 25-hp motor, 220 v, AC; Approval 2-786; Feb. 16.

Joy Mfg. Co.—Type 14BU-8CF loading machine; one 4- and four 15-hp motors, 500 v, DC; Approval 2-965-A; Feb. 21.

Joy Mfg. Co.—Type 9SC1BPE-1 (modified by SBM5945) cable-reel shuttle car; three 15-hp motors, 250 v, DC; Approval 2-1039; Feb. 2.

Jeffrey Mfg. Co.—Electric drive for blower fan; 5-hp motor, 250 v, DC; Approval 2-1040; Feb. 10.

National Mine Service Co.—Type 5SC-7APE/APXE (Joy) cable-reel shuttle car; three 7½-hp motors, 250 v, DC; Approval 2-1041: Feb. 15.

J. H. Fletcher & Co.—Type DAA13-S2-A1-R3 roof-bolting drill; 25-hp motor, 220 v, AC; Approval 2-1042; Feb. 15.

National Mine Service Co.—Types 6SC7PE-1A and 6SC7PXE-1A (Joy) cable-reel shuttle cars; three 7½-hp motors, 250 v, DC; Approval 2-1043; Feb. 23.

Joy Mfg. Co.—Type 10SC2BPF-4 (modified by SBM5995) cable-reel shuttle car; two 7½- and three 15-hp motors, 500 v, DC; Approval 2-1044A; Feb. 28.

Joy Mfg. Co.—Approval 2405 issued Feb. 4 under Schedule 24 for a Type 70E-1 diesel-electric shuttle car.

Pocahontas Fuel Mine Cited for 100% Training

THE BISHOP MINE of the Pocahontas Fuel Co., Inc., recently was recognized for achieving 100% training in accident prevention. Lloyd G. Fitzgerald, mining engineer, USBM, conducted the 10-wks training course for the 784 employees. Watching presentation of a certificate for the accomplishment to Charles Stephenson, Bishop mine superintendent, by James Westfield (far left), chief of the Bureau's Health and Safety Division, Washington, D. C. are: Mr. Fitzgerald (Center), Bureau of Mines instructor; A. V. Sproles, vice president, and A. R. Mathews, president, Pocahontas Fuel Co., Inc.

Preparation Facilities

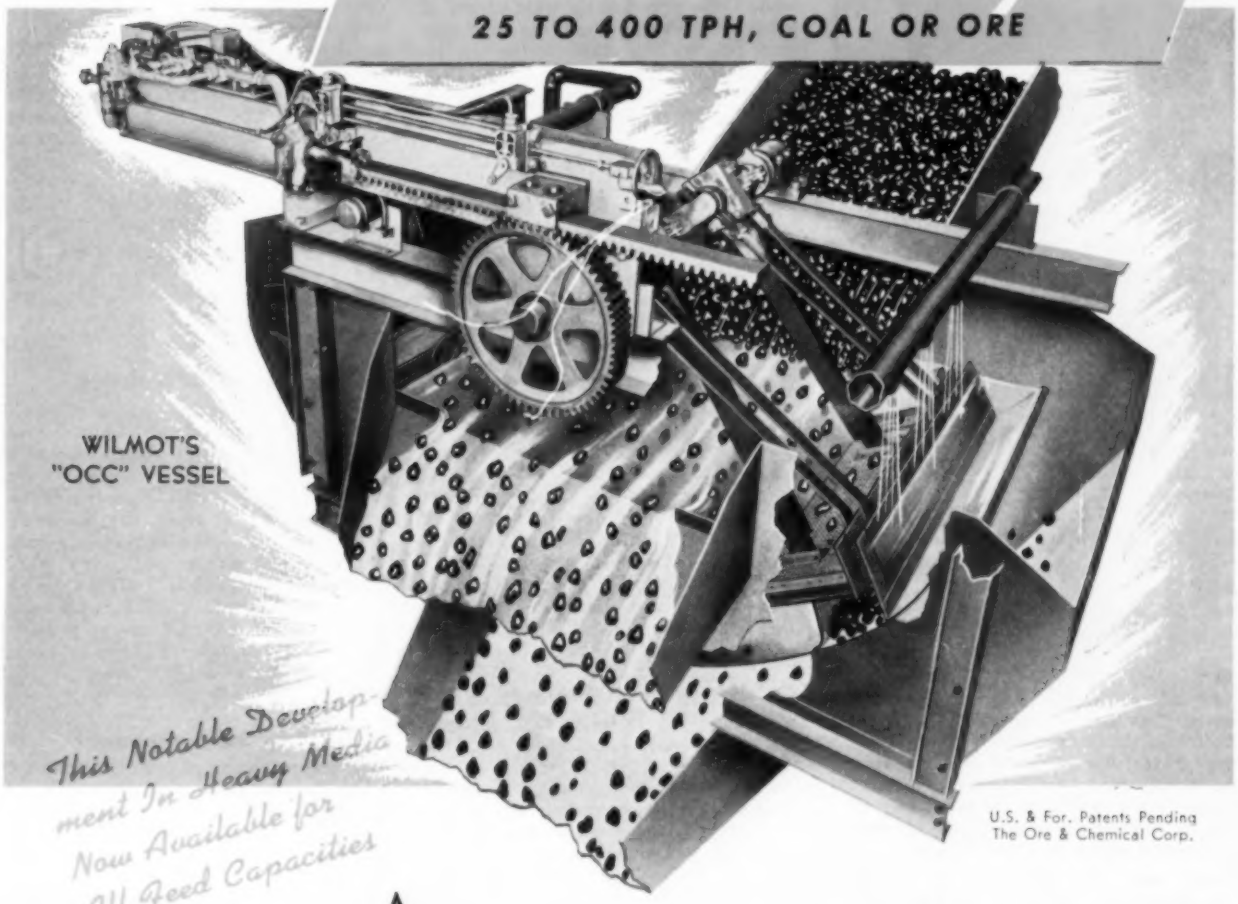
Robey Run Coal Co., Ruby mine, Dola, W. Va.—Contract closed with The Daniels Co., Contractors, Inc., for DMS dense-media coal refinery, producing various sizes and combinations; capacity, 200 tph.

Merrywood Colliery, Tasmania—Shipment of two Super-Duty Diagonal-Deck coal-washing tables for cleaning 1 x 0 reported by Deister Concentrator Co.

WILMOT'S *New* HMS VESSEL

Now in 7 Sizes

25 TO 400 TPH, COAL OR ORE



WILMOT'S
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This Notable Development In Heavy Media Now Available for All Feed Capacities

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An examination of the features of Wilmot's recently introduced "OCC" vessel will, we believe, confirm that here is a notable new development in Heavy Media: (1) entire separating process is performed with only the mechanism and power required for lifting the sink from pool; (2) permits continuous visual inspection; (3) few moving parts; (4) requires little floor space. We assure you that you will find the performance records of the "OCC" vessel genuinely impressive: both in the uniformity of production efficiency, and the really remarkable freedom from maintenance needs.

We Invite You **to send for bulletin about the "OCC" vessel. Or, better, see it in operation. We'll gladly test samples of your feed, coal or ore, at our White Haven, Pa., pilot plant.**

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Among the Manufacturers

Duff-Norton Buys Coffing Hoist

The Duff-Norton Mfg. Co., Pittsburgh, has purchased, effective March 1, the Coffing Hoist Co., Danville, Ill., and will operate the firm in the future as the Coffing Hoist Div. of Duff-Norton Co. Duff-Norton is the world's oldest and largest manufacturer of lifting jacks, while Coffing produces a wide variety of hoists and allied products, the announcement pointed out. Duff-Norton also reported it was changing its name to the Duff-Norton Co. in the interest of brevity and clarity. Operations and personnel will continue unchanged at the Coffing plant except that Fredrick W. Coffing, president and co-founder of the 26-yr old company, will retire. He will continue his association, however, as a consultant. Mr. Floyd will be president of the Coffing Hoist Div., as well as president of Duff-Norton. J. R. Coffing, who has been vice president-sales for Coffing Hoist; J. F. Bookwalter, vice president-manufacturing; and George Buck, secretary-treasurer, will continue to direct the affairs of the Coffing Hoist Div. as a management committee. The election of James F. McCartney and R. S. Bell as vice presidents of the Duff-Norton Co. was announced March 10. Mr. McCartney, who has been Duff-Norton general sales manager since 1950, will continue in that post, directing all company sales activities, including export and Canadian and those of the Coffing Hoist Div. Mr. Bell will continue as controller, a position he has held since joining the company.

Cardox Promotes Hume

Cardox Corp., Mining Div., Chicago, has appointed Joseph C. Hume assistant district manager for southern West Virginia, with headquarters in Logan, W. Va. Mr. Hume became associated with coal mining in 1944 as production engineer for the Blue Diamond Coal Co. and has been active in mining ever since, joining Cardox in 1949 as a field engineer.

Kennametal Names Distributors

Kennametal Inc., Mining Tool Div., Bedford, Pa., has appointed the Pennsylvania & West Virginia Supply Corp., Wheeling, W. Va., and Central Supply of Virginia, Inc., Andover, Va., as distributors of Kennametal mining tools. Kennametal tools will be stocked by Pennsylvania & West Virginia Supply in its warehouses in Morgantown, Triadelphia and Cowen, W. Va., to serve the areas of southwestern Pennsylvania, Ohio, West Virginia and eastern Kentucky. Central Supply will carry stock in its headquarters' warehouse at Andover, Va., to serve the areas of southwestern Virginia, southern West Virginia, and eastern Kentucky. Kennametal field service, including tool application, demonstration, tool recommendation and on-the-job maintenance will be maintained.

Reeves Heads Rockbestos

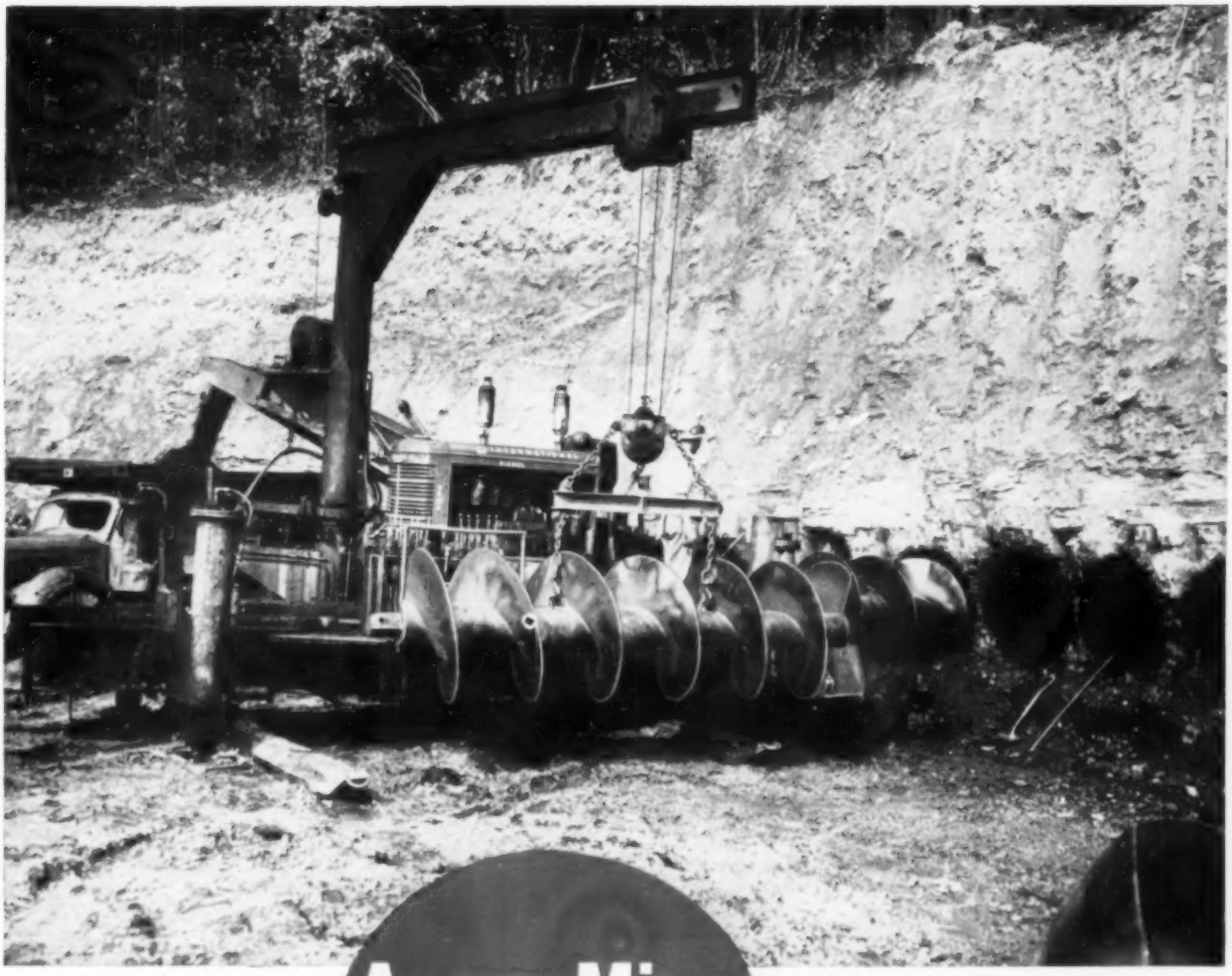
Beauford H. Reeves was elected president and general manager of Rockbestos Products Corp., New Haven, Conn., at a special meeting of the company's board of directors last month. He succeeds the late Arthur Gove Newton, who died suddenly March 3. Mr. Reeves has been vice president and general manager of Rockbestos since 1936. He has been with Rockbestos since 1923, first joining the wire and cable company as an engineer. Previously, he had been works manager of the Fletcher Works, Philadelphia.

Flood City Sales Manager

The appointment of L. A. Grasso to the newly created position of sales manager for the Flood City Brass & Electric Co., Johnstown, Pa., has been announced by C. N. Replogle Jr., president. Mr.

COAL MEN ON THE JOB . . .

SNAP CREEK COAL CO., Rich Creek mine, Tomlinson, Logan County, W. Va.: W. E. Tomlinson (left), chief engineer; C. B. Jennell, chief electrician; Romie Stultz general mine foreman; and J. H. Ford Jr., general superintendent.



McCarthy Coal Recovery Drill, Model 1436-42, with 12' augers as used by Excavators, Inc., Sommerville, W. Va.

Auger-Mine BONUS Coal with McCarthy

Heavy Rugged Powerful

COAL RECOVERY DRILLS

Hydraulically operated equipment on McCarthy Drills includes: jacks for levelling auger drill, auger guide, auger hoist, moving jacks and skids, and auger feed.

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- ★ COMPLETELY HYDRAULIC
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Grasso will direct the company's sales activities in the coal mining, industrial, and contracting fields in western Pennsylvania and northern West Virginia. A graduate of the University of Pittsburgh, Mr. Grasso formerly was associated with the Texas Co. in industrial sales in the Pittsburgh sales territory. Previously, Mr. Grasso held various engineering and maintenance positions with U. S. Steel Corp. and Jones & Laughlin Steel Corp.

New Manager for GE Div.

The appointment of C. Howard Black as general manager of the Construction Materials Div. of General Electric Co., Bridgeport, Conn., has been announced by John W. Belanger, executive vice president of the company's industrial products and lamp group. Mr. Black succeeds Clarence C. Walker, who has been elected commercial vice president for the company's West Coast region. Mr. Black has been with GE since 1924 and until his present appointment was general manager of GE's instrument department at Lynn, Mass. The Construction Materials Div. includes four operating departments: wire and cable, wiring devices, accessory equipment, and conduit products; and has plants in six cities.

Bemis Bro. Bag Appoints

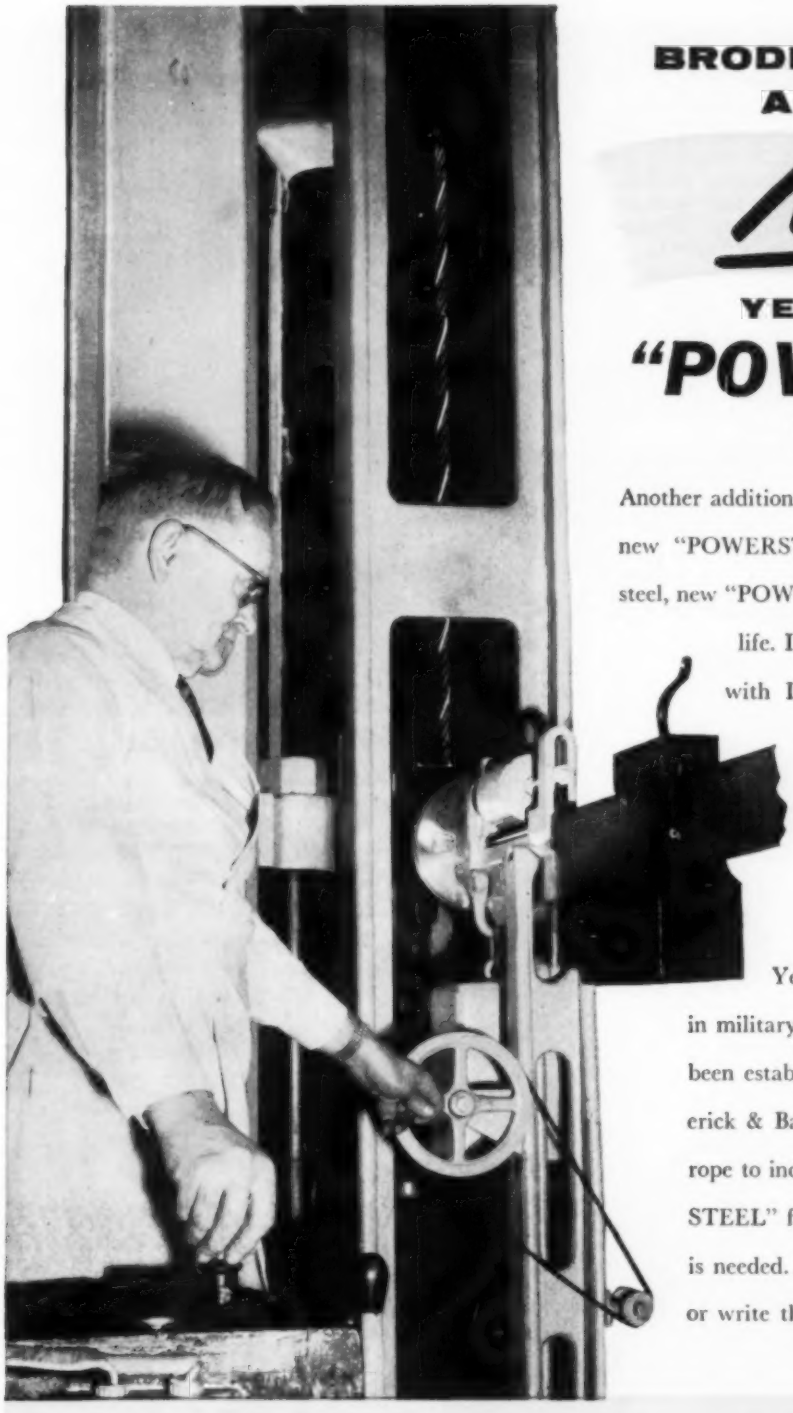
L. A. Linville has been named assistant director of sales for Bemis Bro. Bag Co., St. Louis, Mo., being succeeded as manager of the Bemis multiwall paper bag plant at Vancouver, Wash., by A. B. Williams, formerly sales manager there. With Bemis since 1941, Mr. Linville will function as assistant director of sales in the absence from that post of C. W. Akin, who is temporarily assigned to plastic bag development.

Amer. Hoist Acquires Laughlin

The acquisition of the Thomas Laughlin Co., Portland, Me., has been announced by John E. Carroll, president of American Hoist & Derrick Co., St. Paul, Minn., as the first step of a planned expansion program authorized by American Hoist stockholders a year ago. The Thomas Laughlin Co., more than 50 yr old and employing 250 people, is well established in the forged wire-rope accessory business, and the merger enables American Hoist to market the joint products more effectively by offering a complete line of fittings and wire-rope accessories from a single source, it points out. All employees at Portland will be retained and the plant will be operated as the Thomas Laughlin Div. of American Hoist & Derrick Co.

Knudsen Heads Detroit Diesel

Harlow H. Curtice, president of General Motors, has announced the appointment of Semon E. Knudsen as general manager of the Detroit Diesel Div. of General Motors, Detroit. Mr. Knudsen, son of the late William S. Knudsen, president of General Motors from 1937 to 1940, succeeds William T. Crowe, who is retiring after 35 yr of service with GM. Mr. Knudsen goes to Detroit Diesel from GM's Allison Div. where he has been manufacturing manager for aircraft engine operations since December, 1954.



BRODERICK & BASCOM ANNOUNCES

NEW

YELLOW STRAND "POWERSTEEL" WIRE ROPE

Another addition to the famous Yellow Strand family — the new "POWERSTEEL!" Made of higher carbon content steel, new "POWERSTEEL" is 15% stronger, assures longer life. It withstands shock, resists wear. Preformed, with Independent Wire Rope Core, "POWERSTEEL" is a heavy-duty, crush-resistant rope, designed for long service.

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Yellow Strand "POWERSTEEL" was proved in military service in World War II. Its long life has been established on rugged logging operations. Broderick & Bascom is now presenting this higher quality rope to industry. Check on Yellow Strand "POWERSTEEL" for your tough jobs — where extra strength is needed. See your Broderick & Bascom distributor, or write the branch nearest you for information.

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717 JEFFERSON HIGHWAY NEW ORLEANS, LA.
1330 W. FULTON ST. CHICAGO 7, ILL.
9150 MARKET ST. ROAD HOUSTON 15, TEXAS

Heil Vice President Named

John D. Barclay, general sales manager, the Heil Co., Milwaukee, Wis., has been elected vice president in charge of sales, according to an announcement by Joseph F. Heil, company president. Mr. Barclay has been associated with the Heil Co. for the past 16 yr.

New Joy Vice President

Joy Mfg. Co., Pittsburgh, has elected Louis G. Helmick Jr. vice president of manufacturing. Formerly manager of manufacturing, Mr. Helmick was graduated from Cornell University with a degree in mechanical engineering and joined the Joy organization in 1947 as production control manager at the company's Franklin, Pa., plant. He was later named manager of the plant at Claremont, N. H., and became manager of manufacturing in 1954.

Regional Head for Hewitt-Robins

L. C. Holloman Jr. has been appointed manager of the central sales region of Hewitt-Robins, Inc., with headquarters in Chicago, according to an announcement by Austin Goodyear, vice president. Formerly assistant regional manager, Mr. Holloman joined Hewitt-Robins in 1940 as a field engineer and following various assignments became assistant manager of the newly created South Central Sales Division in 1952. Mr. Holloman succeeds Lester D. Bigelow, who retired in December, 1954. He will be in charge of the sale of conveyor belting, conveyor machinery, rubber hose, vibrating equipment and other industrial products.

Worthington Revises Setup

Aloysius M. Tullo, works manager of Worthington Corp.'s Works in Harrison, N. J., has been appointed general manager of a newly established Harrison Div., and will be responsible for all phases of the division's operations, including sales, engineering and manufacturing. Clarence K. Hood, a Worthing-

COAL MEN ON THE JOB . . .

VALLEY CAMP COAL CO.—Warren Sharpenburg (left), division engineer, Southern Div., and Paul Smith, general mine foreman, Valley Camp No. 8 mine, Shrewsbury, W. Va.

PROFESSIONAL SERVICES

ton vice president, will be division sales manager, and George F. Habach, executive engineer. As an additional step in revising its operational structure, Worthington also is establishing at Harrison a new Standard Pump Div., which will take over all functions related to the sales, engineering and production of standard pumps, consisting largely of small centrifugal and rotary types. New construction for expanding manufacturing capacity for the new division will be completed during the year. Named general manager of the new division is Vincent Gerbereux, with Worthington since 1924, who has been manager of the centrifugal pump division of the general sales department since 1951.

Meeker Made Vice President

Daniel Meeker has been named vice president of Toledo Porcelain Enamel Products Co., Toledo, Ohio. Mr. Meeker has been with Toledo Porcelain Enamel since 1931, having served as plant engineer, architectural engineer, district manager in New Jersey, plant superintendent and sales manager before his recent appointment.

IH Names Division Manager

W. F. Hall has been appointed manager of industrial power central sales region, International Harvester Co., Chicago, replacing L. A. Coomer, who has been transferred to the company's eastern sales region in another capacity. Mr. Hall began his career with Harvester in 1939 and joined the industrial power sales organization in 1952 as general supervisor of industrial power service. Since July, 1953, he has served as assistant central regional sales manager, industrial power division.

ESB To Expand Research

Creation of a new research division on the corporate level and expansion of research activities of the Electric Storage Battery Co., under direction of Dr. L. E. Lighton, vice president, has been announced by C. F. Norberg, president. Research for all company divisions will be separated from development engineering and will be carried on in a new center located at the company's Crescentville plant in northeast Philadelphia. Dr. Lighton has been vice president in charge of engineering since 1945. He joined the company in 1920 as a sales engineer and was transferred to Philadelphia in 1925 as manager of automotive manufacturers sales. In 1935 he was moved to the engineering department and in 1940 became assistant manager.

Cummins Engine Expands

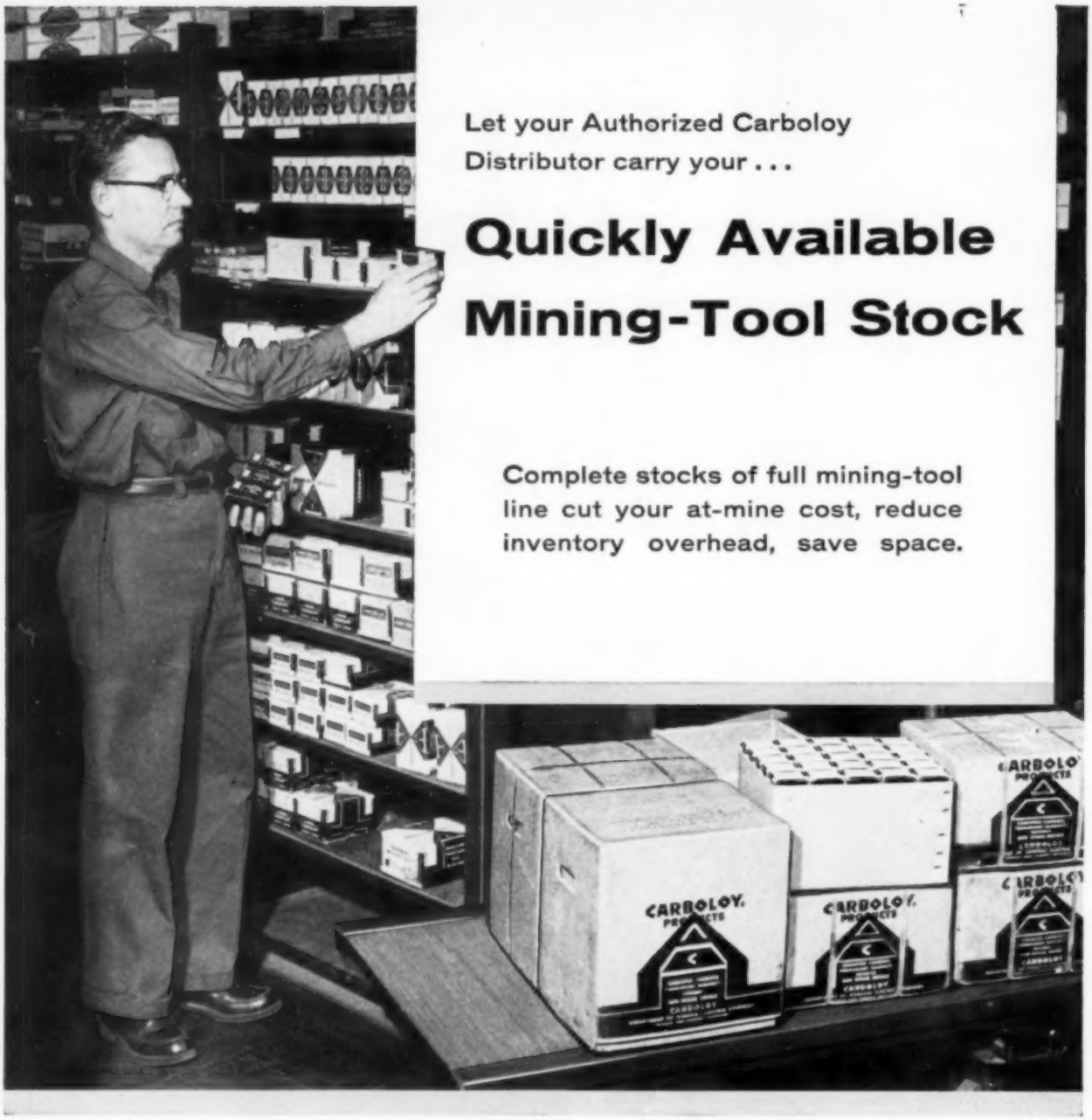
Cummins Engine Co., Inc., Columbus, Ind., has announced that it will again increase its engine production rate starting March 1. According to R. E. Huthsteiner, Cummins president, the new schedule will be the highest in the company's 36-yr history and at a rate about 17% over recent all-time highs. Employment will be increased. The company also announced that the new addition to its research laboratory, representing a 60% expansion of these facilities, is nearing completion, with occupancy expected May 1. "As the major independent supplier of high-speed, light-weight diesel engines, Cummins plans to expand its research activities and to be constantly on the alert for new designs and methods which will enable the company to keep its products competitive with respect to quality, performance and cost," Mr. Huthsteiner said.

And For Your Information . . . . .

Thermoid Co., Trenton, N. J., has appointed Thomas H. Olson assistant division manager of its Chicago district office. Mr. Olson has had extensive experience in the mechanical rubber goods industry in Chicago and surrounding area and his appointment is a part of Thermoid's program for expanded service to the industrial and farm markets.

Norton Co., Worcester, Mass., has appointed two new abrasive engineers and a new field engineer. Laurence G. Holfelder has been assigned to the central Indiana territory, and James A. Coleman will cover the territory in the area of Kansas City, Mo. Raymond B. Goodale has been appointed a field engineer at Norton's Chicago district office. All three are former members of the sales engineering department.

The American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill., has appointed Nelson M. McGuire assistant to the vice president



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Complete stocks of full mining-tool line cut your at-mine cost, reduce inventory overhead, save space.

If you are now using carbide mining tools – take advantage of this local service. Purchase mine-proved carbide tools from complete stocks ready to fill your orders instantly.

If you have not changed to carbide mining tools –investigate the cost savings possible by changing from steel to carbide tools. Carboloy® carbide mining tools consistently outlast steel tools up to 50 times. They increase tonnage per shift by cutting more coal in less time, more freely, and with decreased power consumption. Tonnage goes up 20-30 percent per shift.

Your local distributor is listed on the opposite page. Use his complete stocks as your own. Ask for his help on any carbide mining-tool applications.

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

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Carboloy Created-Metals for Industrial Progress

for sales. Formerly assistant advertising manager in charge of advertising for three divisions of the company, Amsco, National Bearing and Electro-Alloys, Mr. McGuire will continue to handle the advertising for Amsco in addition to new sales responsibilities.

A. J. Lamond has been named manager of packing sales for Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia 24, Pa., according to an announcement by G. A. Dauphinais, vice president and general manager. Mr. Lamond has 12 yr experience serving Quaker in such capacities as foreman in the belting department and assistant to the belting sales manager. He will coordinate the factory and field activities of Quaker's sheet packing sales.

American Air Filter Co., Louisville, Ky., has opened a new branch office to handle the sale of Herman Nelson heating and ventilating products in Denver, Colo. Cyril DiMercurio will be in charge of the new office, at 1660 Gilpin St., and will cover Colorado and Wyoming. Air Filter products of the company in the Denver area will continue to be handled by the Herman & von Rosenberg organization, 1228 California St., Denver; and AAF dust-control products will remain with Richards & Associates, 2415 15th St., Denver.

Charles H. Hallett has been appointed assistant manager of sales at the Chicago plant of Joseph T. Ryerson & Son, Inc., steel distributor. With Ryerson since 1941, Mr. Hallett has been engaged in sales work at the company's Los Angeles steel service plant for the past 6 yr.

The MW Construction Equipment Div. of Metalweld, Inc., Philadelphia, has been appointed exclusive distributor by the International Harvester Co. to sell and service industrial crawler tractors, motor scrapers, dozers, loaders and wheel tractors in eastern Pennsylvania, southern New Jersey and northern Delaware. The company is enlarging and improving its facilities to provide a new parts depart-

COAL MEN ON THE JOB . . .

MERRILL COAL CO.: Elbert Vance (left), general night foreman, and Lee Fraley, superintendent, Taplin Mine, Taplin, Logan County, W. Va.; and William Vargo (right), preparation engineer for mines of the Merrill Coal Co. and affiliated properties.

MERRILL COAL CO.: Big Creek mine, Big Creek, Logan County, W. Va.: Tom Pill (left), general mine foreman; V. W. Lilly, tipple foreman; Orsell May, chief electrician; and James Craddock, mine electrician.

ment and greater customer service. Edgar B. Shepard has joined the organization as manager of tractor sales to handle the IH account. Mr. Shepard was formerly eastern district representative for Pitman Mfg. Co., Kansas City, Mo.

The Monarch Rubber Co., Hartville, Ohio, has appointed William H. Filter sales manager for the company's southern and western sales territories, responsible for sales on Monarch's complete line of industrial solid tires and molded mechanical goods. Mr. Filter has been serving as executive assistant to the treasurer since he joined the company in January, 1954. Robert J. Himmelright Jr. has been promoted to assistant to the president, responsible for widely diversified administrative functions. Mr. Himmelright joined Monarch Rubber's sales force in 1949 and was promoted to assistant sales manager of both the Molded mechanical goods and industrial tire divisions in 1951. He was given the additional responsibility of advertising manager in 1953.

C&D Batteries, Inc., Conshohocken, Pa., has formed an export division under the supervision of Ballagh-Thrall, Inc., an export sales management firm, a move made advisable by the increasing demand for C&D products from foreign markets according to S. W. Gibb, C&D vice president in charge of sales. The formation of the new division follows closely on the heels of an expansion program at C&D, which included the opening of a new plant in November of last year.

Organization of a Canadian subsidiary, Prenco-Aeroquip, Ltd., Toronto, Can., has been announced by Matthew J. Betley, vice president and general manager of Aeroquip Corp., Jackson, Mich. Prenco-Aeroquip, Ltd. is already in business, having acquired all the assets of Prenco Progress & Engineering Corp. of Toronto, which was formerly licensed to manufacture Aeroquip products in Canada.

Paul L. Gallagher has been appointed manager of pipe sales for the Claymont

COAL MEN ON THE JOB . . .

FARWEST COAL CO., Van Lear, Ky.—J. O. Watson (left) and G. W. Merritt, partners.

Steel Products Dept. of the Colorado Fuel & Iron Corp. Mr. Gallagher will be located at Wilmington, Del., sales office of Claymont Steel Products, which is a department of the Wickwire Spencer Steel Division of CF&I.

Atlas Powder Co. has announced the opening of its new general offices, at Concord Pike and New Murphy Rd., Wilmington 99, Del.

The Barry Corp., Watertown, Mass., has announced that in keeping with its expanding product line it has changed its name to a more accurately descriptive title, Barry Controls, Inc. Established 11 yr ago as a war baby making shock isolators for the Navy, Barry Controls is currently conducting a successful drive to reach out into the peacetime industrial market with engineered mountings to control noise and vibration for everything from machine tools to dictaphones, it reports.

Consultants Named for Solar Energy Conference

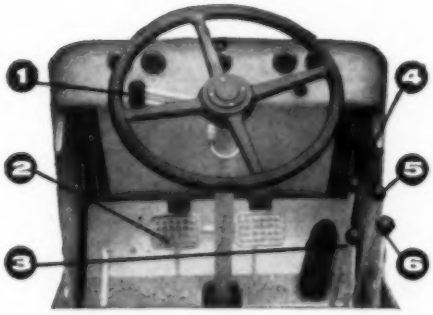
Members of the technical advisory committee for the World Symposium on Applied Solar Energy, to be held in Phoenix, Ariz., November 2-5, were announced recently by Lewis W. Douglas, general chairman of the symposium.

Named to the advisory committee are: Dr. Charles G. Abbot, research associate, Smithsonian Institution, Washington, D. C.; Dr. Vannevar Bush, president, Carnegie Institution of Washington; Dr. Godfrey Lowell Cabot, chairman of the board, Godfrey L. Cabot, Inc., Boston; Dr. Farrington Daniels, chairman of the Department of Chemistry, University of Wisconsin; Dr. Lawrence J. Heidt, associate professor of physical chemistry, and Hoyt C. Hottel, director of Fuel Research Laboratory, both at Massachusetts Institute of Technology.

Also: Dr. Harold Heywood, assistant professor, Imperial College of Science and Technology, University of London, England; Dr. George O. G. Lof, consulting chemical engineer, Denver, Colo.; Dr. Eugene Rabinowitch, research professor of botany, University of Illinois; Dr. Maria Telkes, research associate, College of Engineering, New York University; Dr. Felix Trombe, director of Laboratoire de l'Energie Solaire, Paris, France; Dr. E. J. Workman, president, New Mexico Institute of Mining and Technology; and Frank Lloyd Wright, architect, Arizona and New York.

The symposium, which will bring scientific and industrial interests to bear on practical applications of solar energy, is being co-sponsored by the Association for Applied Solar Energy and Stanford Research Institute. Chairman of the association's executive committee is Henry B. Sargent, president and general manager of the Arizona Public Service Co., Phoenix.

Faster, more power,
and LOOK, NO CLUTCH!



It's a pleasure to work here!

1. **Power-shift levers:** for Forward-Reverse and High-Low; make any shift while moving in either direction.
2. **That's no clutch!** It's a double-pedal brake, use it with either foot.
3. **Break-out bucket lever:** work the bucket in the pile—you've got two big double-acting bucket cylinders for tremendous breakout power, independent low-level tip back.
4. **Range Shift:** working or travel speed
5. **Drive Selector:** 4-wheel and 2-wheel
6. **Boom Control**

Until you see a MICHIGAN in action, you won't believe that it's possible to deliver so much power with such ease of operation. Your driver stays at peak efficiency all day long because there's no conventional clutch on a MICHIGAN. Instead, the MICHIGAN's exclusive power-shift transmission does all the shifting hydraulically—and eliminates the most notorious cause of excessive maintenance and driver fatigue.

In addition to effortless, instantaneous shifting, you get up to 300% torque multiplication on a MICHIGAN —from the Clark-built converter. With this kind of smooth, shockless power transmission, you get the full advantage of the MICHIGAN's extra weight and higher horsepower.

A demonstration (on your own job, if you wish) is the only way to get a real understanding of what this machine can do! Just write or call us—and don't forget that all MICHIGAN's are available on the low-cost MICHIGAN Lease Plan.

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Construction Machinery Division
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NEWS . . . . . From p 122

trifugal driers, Multi Louvre thermal drier, 50-ft Dorr thickener and filter to recover very fine coal, dustproofing and freezeproofing, and layer loading. A fully equipped laboratory adjacent to the plant will analyze coal on each of the loading shifts.

Soviet Coal Shortage Explained

The removal of Alexander F. Zasyadko as head of Soviet coal production has been linked to poor performance in the mines. The extent of present Soviet coal shortages is indicated by the record-breaking production goal set for this year. Soviet coal producers have been ordered to increase their output about 13%, from 380,000,000 to 430,000,000 short tons. This 50,000,000-ton increase is over 50% more than the average annual increase of recent years. In part, coal production has failed to keep pace with needs because requirements have grown faster than expected. Recent press comment explains the lag in coal production as apparently due to these main weaknesses in the Soviet coal industry: a shortage of mining engineers and technicians in the mines, inefficient use of coal-mining machinery, poor organization of labor in the mines, and the lack of balance between geographical needs and geographical production.

Committee Sells Houston, Ohio School Board on Coal Heat

Although fuel oil had been tentatively recommended for a new school addition at Houston, Ohio, final plans call for installation of coal heating equipment. The switch in plans is attributed to the quick action and aggressiveness of a 7-member "Minute Men" committee in making a thorough presentation to the school board on the cost advantages of coal heat and equipment, as compared to alternate fuels. Mimeographed copies of the presentation are available from NCA's Market Promotion Department.

COAL MEN ON THE JOB . . .

JEWELL RIDGE COAL CORP.—Charles Newsome (left), general night foreman, and Charles Ferrell, section foreman, Peach Creek No. 5 mine, Peach Creek, Logan County, W. Va.

Insulated to Cut Your Downtime

ROCKBESTOS AVC®

MOTOR LEAD CABLE

Rockbestos AVC is built to eliminate internal wiring failures on locomotives, loaders, cutters and shuttle cars. Keeps them going longer . . . helps increase your tonnage. That's why leading equipment manufacturers specify and buy it.

Constructed of non-burning asbestos, impregnated with heat and moisture resistant compounds, wrapped with dielectrically strong varnished cambric, it's practically indestructible. Takes heat up to 230°F without cracking or drying out. Resists acids, oils, alkalies and minerals.

Sized to fit bushings properly, it withstands the roughest vibration and shock common to mine service.

You'll find it pays to follow the leaders . . . and insist on Rockbestos AVC for all your new and old machines.

ORDER FROM THESE JOBBERS — SPECIFY "ROCKBESTOS A.V.C."

BECKLEY, W. VA.
National Mine Service Co.
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Fairmont Supply Co.
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HARLAN, KY.
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Banks-Miller Supply Co.
INDIANA, PA.
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LOGAN, W. VA.
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LOTHAIR, KY.
Mine Service Co.
McCLURE, VA.
Erwin Supply & Hardware Co., Inc.
MIDDLESBORO, KY.
Rogan & Rogan Co.
MORGANTOWN, W. VA.
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Plan Coal Plants for Colorado and Montana

Cotarco, Inc., a subsidiary of Resources International Corp., New York City, plans to build a $11.5 million low-temperature coal-carbonization plant in Colorado, according to the company's announcement last month. Final selection of the site was expected in March. Cotarco said it has obtained agreements for exclusive use of the patented "Low Temperature Coal Distillation Process" developed by Dr. F. E. Poindexter, St. Louis University director of physics, and Frank Lowe, St. Louis industrial engineer. The company estimated daily production would be 5,930 tons of char product, 15 million cu ft of fuel gas at 645 Btu, 71,100 gal of acid oil, 6,400 gal of light oil, 57,300 gal creosote oil, 72,000 gal of pitch, and 67 tons of sulphur.

As a result of research at Montana State College, the PDP Co., of Lewiston, Idaho, plans to build a $100,000 char plant to obtain by-products from Montana coal deposits. Several Montana cities are being considered as possible sites. The research was conducted with an experimental plant moved to the college at Bozeman from Melstone, Mont., by PDP. The plant was invented by Frank Hobson, a Missoula mining engineer. The experimental plant has a capacity of 1 ton of coal an hour and is operating 24 hr a day, testing coal from various Montana fields. Dr. Lloyd Berg, head of the college chemical engineering department, has been directing the research. He said the plant has produced carbon, creosote, road tar and organic solvents used in textiles. PDP officials think that the continuous process developed at the college can reduce the cost of plant construction, lower the cost of operation, and improve coal by-products.

Red Jacket Safety Awards to Keen Mountain

Awards for safety achievements during 1954 were presented to the Safety Committee and the UMWA Local, Keen Mountain (Va.) mine, at the Ninth Annual Labor-Management Dinner of the Red Jacket Coal Corp. C. H. Williams, chief engineer, Red Jacket, opening the meeting, on Feb. 19 at the Mountaineer Hotel, Williamson, W. Va., introduced Toastmaster Charles Kiser, district representative, UMWA. As the president of each local was introduced, he, in turn, presented the other officials of that local and the members of the safety committee.

In 1954, Keen Mountain achieved a frequency rate of 29.94 and a severity rate of 1.57. Twenty sections of the mine worked throughout the year without a lost-time accident. The mine has produced 2,490,000 tons since the last fatal accident.

R. A. Ison, assistant to the president, Red Jacket, presented the awards to the

*Note extremely rugged conditions in this photo, showing bottom loading conveyor system in British coal mine. Inset shows roll of SCANDURA.

For **FIRE SAFETY,** Long Life and Economy —

NEW **SCANDURA**

The original P. V. C. coated conveyor **BELTING**

You want *extraordinary resistance* to wear and tear with top tonnage hauls—and you get it with SCANDURA. But even more, you want *fireproof conveyor belting* that eliminates one of the great hazards of mining—fire caused by friction when your conveyor belt slips or stalls.

LET'S LOOK AT THE RECORD!

About 12% of coal mining fires in the past several years have been attributed to conveyor-belt friction.

At the 1953 annual meeting of the Illinois Mining Institute, data was presented to show that the majority of belt fires result from stalled belts while the driving pulley continues pulling.

In the tragic Evanston, Ky. fire in which 4 men lost their lives, fire was reported to have had its origin in the friction caused when a fall stopped the belt, while the drive motor continued to operate. This record clearly points to the great need for SCANDURA BELTING!

SCANDURA, developed by our parent company, and now being manufactured in our Charlotte, N. C. plant, has these unique features:

- *Withstands abrasions that would ruin other belts.*
- *Exceptionally tenacious in holding fasteners.*
- *Solid woven base with covers that will not strip, gouge or "dog ear".*
- *Not affected by water, dilute acids, alkalis, salt solutions, etc.*
- *Non-inflammable, mildew and rot-proof.*
- *Works in temperatures ranging from 22° below to 212° above.*
- *Can be made in widths from 1" to 42" and thicknesses from ⅛" to ⅜".*

SCANDURA has been tested and used with gratifying results in Britain since 1946. For safety and economy, it's in a class by itself. Write, wire or telephone for complete data.

SCANDINAVIA BELTING COMPANY
250 CENTRAL AVENUE, NEWARK 1, N. J.
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COAL MEN ON THE JOB . . .

YOUNGSTOWN MINES CORP.—E. B. Jolly (left), preparation engineer, and R. D. Saltsman, resident engineer, Dehue, Logan County, W. Va.

Keen Mountain Safety Committee for the 1954 record. William M. Ritter, president, Red Jacket, awarded a plaque inscribed with the safety achievement to the Keen Mountain Local. Other speakers at the dinner included: W. R. Park, district supervisor, Mt. Hope office; W. H. Tomlinson, training administrative officer, and Harold J. Sloman, assistant to the director, USBM; Julius Olzer, administrative assistant, W. Va. Department of Mines; J. J. Plasky, training and safety director, Red Jacket; and Carl Hibbitts, president, District 28, UMWA.

Claim Bonn Support For Coal Necessary

Mine operators and union officials in West Germany have started a movement for government subsidy of higher wages and prices. Miners have served notice that a strike is inevitable unless a 12% wage increase is granted. The Ruhr coal industry contends it is working with an actual over-all loss of about 20c a ton, increased through a special capital tax to around 40c. Miners point to a steady increase in production without improvement in wages. The Government says that an increase in the price of coal, because of its key position in the German economy, could disorganize the whole price structure. If an increase in the price of coal is a threat to the general economy, both mine operators and the union believe the community as a whole should bear the burden of keeping the price of coal down, and not mine operators and coal miners.

Yale, Mich., School Favors Coal Heat

Modernized coal will be used for the new Yale Elementary School at Yale, Michigan. Gordon Williams, superintendent, Yale Public Schools, says "our experience with other fuels from an operational, labor and cost point of view was instrumental in our return to coal. We have found that the 'so-called' automatic fuels leave something to be desired and require just as much attention

Since 1856

HUMBOLDT

Mines Equipment, Mineral Dressing Plants, Crushing and Grinding Machinery, Cement Mill Outfit, Metallurgical Works, Coal Preparation Plants, Steel Constructions for Buildings and Bridges.

Since 1864

DEUTZ

Otto, Gas, Diesel-Engines for Every Purpose of Two-and Four-Stroke Design, Output Range 3–2000 H. P. Cooled by Water or Air, Diesel-powered Tractors, Diesel Locomotives, Gas Producer Plants.

Since 1864

MAGIRUS

Trucks and Busses driven by air-cooled DEUTZ Diesel Engines, Vehicles for Municipal Services, Fire Ladders, Fire Engines, Fire-Fighting Water Trucks, Two-wheeled Ladders, Fire-Fighting Equipment.

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Send inquiries to either Köln, Germany or Ulm, Germany

Address inquiries from U.S.A., Alaska, Hawaii and Puerto Rico to: DIESEL ENERGY CORPORATION, 143 Liberty Street, New York 6, N.Y. Certain territories open for distributors.

as coal-fired plants. At one time, our labor situation was studied and we discovered that the use of oil would not reduce the number of maintenance personnel required. The size of the building determines the number of men required, not the fuel being used."

Bituminous Output up 10.3%

1955 bituminous production through the week of March 12 was 85,806,000 tons, 10.3% ahead of the 77,822,000 tons produced in the same period of 1954, USBM figures reveal. The output for the week ending March 12, 1955, was 8,310,000 tons, compared with 7,780,000 tons in the same week of 1954. Pointing out that the bituminous tonnage produced in every month since last November had shown an increase over the corresponding month the year previous, Appalachian Coals, Inc., forecast last month a total tonnage for the first quarter of 1955 of 104 or 105 million tons, 8 or 9 million tons above the first quarter of 1954. ACI also estimated that bituminous stocks above ground were almost 10 million tons below the level of a year ago. Anthracite production from Jan. 1 to March 12, 1955, was 5,516,000 tons, 7.0% under the same period of 1954, according to the USBM.

NCA Seeks Cancellation of 12% Coal Freight Rise

The National Coal Association petitioned the Interstate Commerce Commission March 22 for cancellation of the temporary 12% increase in railroad freight rates on bituminous coal because of the industry's "dire condition." The increased rate is part of a schedule approved by the ICC in 1952 and is slated to expire at the end of 1955. The NCA's request was prompted by reports that the railroads were planning to ask the ICC to continue the increase and possibly boost it, it was said.

Company Earnings Reports

Pittsburgh Consolidation Coal Co.—1954 net income of $11,108,249, or $5.15 a share, exclusive of profit on disposal of properties and investments, compared with a 1953 net of $14,439,435, or $6.71 a share. Total 1954 revenues were $151,155,911, down 20% from the $188,534,791 recorded in 1953. Dividends paid in 1954 totaled $3.00 a share, the same rate as paid the last 3 yr.

Pocahontas Fuel Co.—1954 net income of $1,701,461, equal to $1.81 a share, compared with $1,797,665, or $1.90 a share, in 1953.

West Kentucky Coal Co.—1954 net income of $893,096, or $1.04 a share, as compared with $1,788,133, of $2.09 a share, in 1953.

West Virginia Coal & Coke Corp.—1954 net income of $52,744, as compared to $554,581 in 1953. River operations income was reported at $875,500 for 1954, compared to $1,464,340 the previous year. Coal operations showed a

OC-18 strips more yards per dollar... extra power, high speeds do the trick!

On this strip mine operation an Oliver OC-18 with cable dozer was used to remove overburden. Long, heavy dozing runs were needed to clear the site. The OC-18 with its fast, powerful dozing gear and high-speed reverse proved the most profitable choice.

The high-stepping diesel engine in the OC-18 features an exceptional torque span—lugging power steps up as the tractor slows under load. In first gear, the OC-18 gives 31,000 drawbar pounds' pull at 1½ miles per hour! This rugged tractor can move more yards in less time. And with a high reverse of 3½ miles per hour, it will cut hours and dollars from your dozing cycle.

The OC-18 gives you more for your money, too. Balanced design eliminates dead weight... puts every ounce of power to work at lowest fuel cost. In fact, the OC-18 has the greatest power-to-weight ratio of any tractor in the 133 drawbar h.p. class.

For sheer operating ease and maneuverability, the OC-18's finger-tip air steering and convenient controls take second to none. Test this fast, powerful tractor yourself. Call or visit your Oliver Industrial Distributor for a demonstration.

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois
a complete line of industrial wheel and crawler tractors

loss of $782,756 in 1954 against a loss of $375,924 in the preceding year. President Morris Creditor explained to the stockholders that the company incurred a net loss of $4,181,468 in selling certain of its coal mining facilities, in making provision for loss on the subsequent sale of certain coal lands and all of its operating mines in Logan County, West Virginia, and in disposing of certain river equipment. This sum was charged directly to earned surplus and was not included in operating income. "Substantially all of this loss is available for tax purposes as an operating loss carried forward to offset net taxable income for the years 1955 through 1959," Mr. Creditor said.

And For Your Information . . .

At the end of 1954 there were 234 Joy continuous miners in use in the United States, with an additional 24 on order as of Dec. 31, the Joy Mfg. Co. has reported.

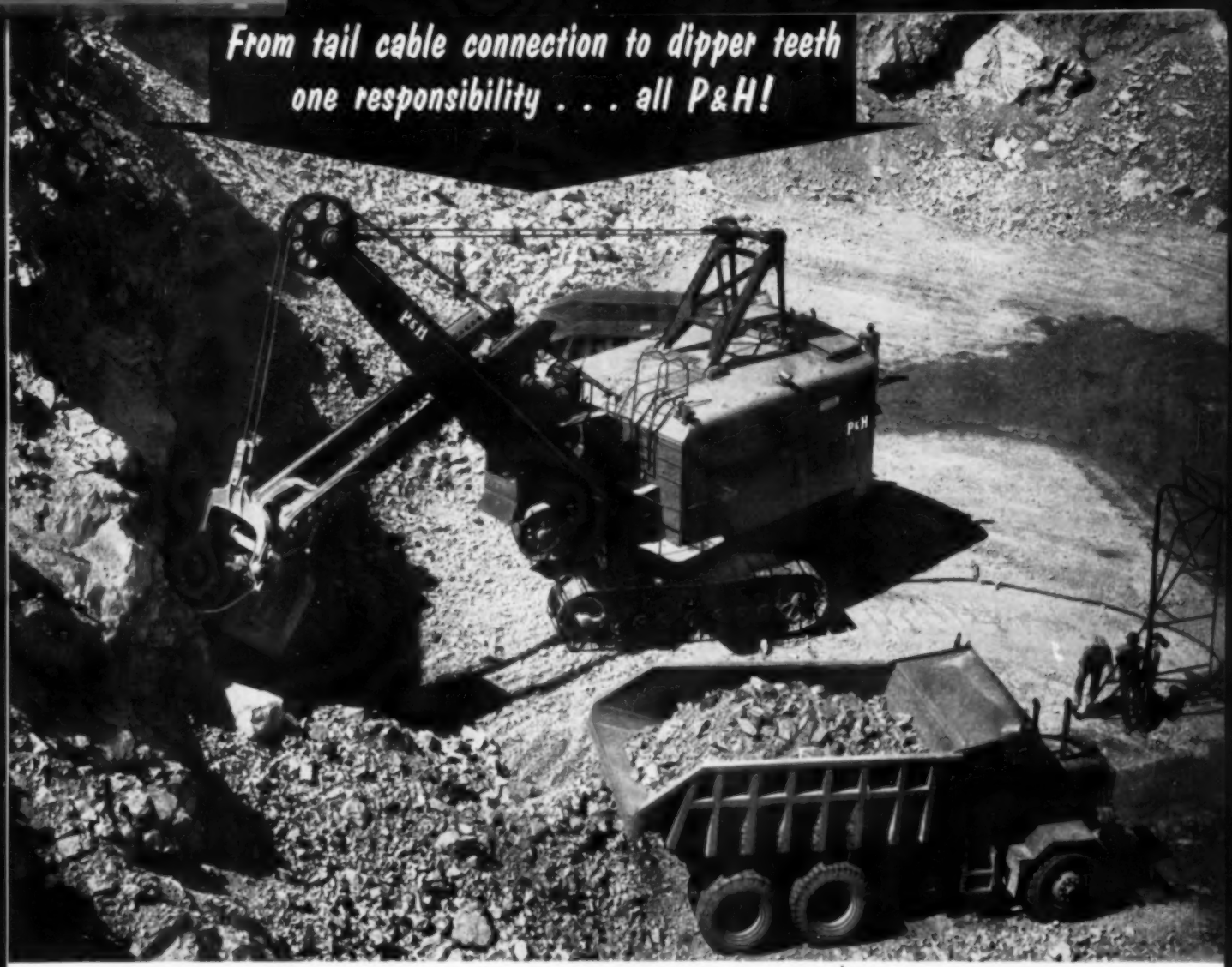
Plans for re-opening of several mines closed for some months were reported recently. Among them was the Crescent No. 2 mine of the Republic Steel Corp., which was to re-open for limited operations, producing about 1,000 tpd, as soon as maintenance work was completed. The mine was closed a year ago. The C. H. Mead Coal Div. of the North American Coal & Dock Co. was planning to resume limited production of some 300 tpd at its East Gulf No. 3 mine, which had been closed since last October because of market conditions.

An earth and slate dam at the Moss mine of the Clinchfield Coal Corp., Clintwood, Va., collapsed March 12, causing a flood that demolished a two-story concrete-block bathhouse and a nearby residence and covering the lower floor of the tipple and other mine facilities with mud and silt. The dam, used to hold water from the coal-washing plant, apparently had been weakened by continued rains and a downpour earlier in the morning had raised the water so that it broke through the dam. Miners using the bathhouse lost much of their personal effects and the washing plant was closed down for cleanup and repair.

Anthracite central heating plants can be installed in unheated apartment buildings in New York City and landlords can begin to make money on their investment in the fourth year of their operation, according to a study released March 17 by the Anthracite Information Bureau. The figures are based on the allowable rent increases for additional services and indicate that fuel costs would take up only 30% of the increases permitted.

The operating headquarters of the Hanna Coal Co., Div. of Pittsburgh Consolidation Coal Co., will be moved from St. Clairsville to Georgetown, Ohio. No transfer date has been set until plans for expansion are complete at Georgetown.

The Senate Labor Committee of the Kansas State Legislature, by a 5 to 2 vote, killed a proposal entered by Sen.



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ELECTRONIC CONTROL — provides marked advantages over any other type of control available on electric shovels today. It's far easier, of course, and completely effortless. *Fatigue factor at end of shift is hardly discernible.* Response is faster. It is applied to all operating functions and arranged so the operator has co-ordination to get the utmost out of his shovel. Comparative tests indicate cycles 10% faster.

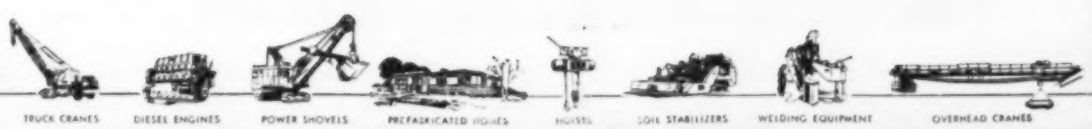
MAGNETORQUE* HOIST DRIVE — the electro-magnetic power transmission that provides faster dipper speeds at heavier bail pull. Higher torque is automatically produced at low speeds and vice versa. It enables you to come through the toughest banks with the smooth surge of power where other dippers falter or stall. It means extra production. Inherent slip characteristics cushion machine from impact stresses. Magnetorque is friction-free, worry-free; proved in over 1000 installations.

These two P&H exclusive features team up with many other advancements to give you still lower production costs in all kinds of open pit work. We have facts that speak volumes. You should have them. Write us. Ask to see the movie "Magnetorque Hoist Drive." P&H Electric Shovel Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

HARNISCHFEGER

the P&H Line



COAL MEN ON THE JOB . . .

POCAHONTAS FUEL CO., INC.— B. H. Hilmon (left), maintenance foreman, and B. G. Bird, chief electrician, Pocahontas Colliery No. 31, Amonate, W. Va.

Jim Bradford and Sen. Dillard Croxton, to reclaim strip-mined waste land in southeast Kansas, including leveling of spoil banks. Two years ago the same committee approved Bradford's bill but it was killed when the Calendar Committee failed to bring it up for debate.

Application was filed with the Federal Power Commission by the Clinchfield Coal Corp., Dante, Va. Jan. 27, requesting the commission to disclaim jurisdiction but, as an alternative, to authorize construction and operation of 16 mi of pipe line to transport natural gas produced in southwestern Virginia. The gas would be sold to Kentucky-West Virginia Gas Co., Pittsburgh. Estimated cost of the project is $785,000.

The tipple and preparation plant of the Germantown (Pa.) mine of the Raven Run Coal Co. was destroyed by fire of an unknown origin on the night of Feb. 22, idling 300 miners for an indefinite period. The damage has been estimated at $100,000.

The entire 59-ship fleet of Pittsburgh Steamship Div., U. S. Steel Corp., will proceed to Lake Superior to open the shipping season April 4, weather and ice conditions permitting, it was announced by Donald C. Potts, president of the division. Mr. Potts said there is every indication the 1955 shipping season will exceed that of 1954 in larger tonnages of raw materials transported on the Great Lakes.

Night Blasting Forbidden in Plains Township, Pa.

As a result of agreement between civic authorities and coal companies, commissioners of Plains Township, Pa., adopted, on Feb. 9, a new ordinance which forbids strip mines from blasting between 10 pm and 6 am. The compromise superceded a previous ordinance requiring companies to obtain a permit for night operations. The ordinance also requires strippers to deposit a bond or insurance policy with limits of $100,000 for personal injuries and the same amount for

property damage to protect the person and real estate of residents. Coal companies have agreed not to contest the validity of the new ordinance, which became effective Feb. 24. The penalty fixed for violation of the regulation is a fine of not more than $300 or 30 days imprisonment for failure to pay. First to be fined under the new ordinance are the president and two employees of the CB&M Coal Co. The company is appealing the conviction, contending that the evidence at the hearing was insufficient to sustain the charge.

Colorado School Mines Sets Annual Engineers' Day

The Colorado School of Mines will hold its 21st Annual Engineers' Day program April 15-16. Events include technical sessions conducted by experts in the mineral industries, scholarship awards to outstanding Colorado high school seniors, prizes for technical papers by Mines students, rock drilling and mucking contests, and guided tours of the Mines campus and the college's experimental mine. Engineering and industrial firms will display latest equipment and technical materials in the Mines fieldhouse.

Gordon Conference in June

The Gordon Research Conference on Coal will be held at New Hampton School, New Hampton, N. H., June 20-24. Dr. Everett Gorin, Pittsburgh Consolidation Coal Co., is chairman of the meeting, and Dr. H. H. Storch, American Cyanamid Co., is vice chairman. The conferences, sponsored by the American Association for the Advancement of Science, were established to stimulate research in universities, research foundations, government and industrial laboratories. Their purpose is achieved by an informal type of meeting consisting of scheduled lectures and free discussion groups. Applications for attendance should be sent, preferably before April 20, to W. George Parks, director, Department of Chemistry, University of Rhode Island, Kingston, R. I.

COAL MEN ON THE JOB . . .

VIRGINIA OPERATORS—C. F. Belcher (left), owner, Caudle Belcher Coal Co., and Lee Merritt, partner, Standard Smokeless Coal Co., operating in the Whitewood section of Virginia.

COAL CRUSHERS
1—24"x24" Jeffrey single roll

TUGGER & SLUSHER HOISTS
1—7½ HP Sullivan double drum electric
1—10 HP Sullivan 3 drum
1—Ingersoll-Rand 6HC air tugger
1—Ingersoll-Rand D6U air tugger
2—6½ HP Sullivan tuggers, 250V. D.C. single drum
7—6½ HP Sullivan 2 drum, 250V. D.C.
1—10 HP Sullivan 2 drum, gas engine driven

BOX CAR LOADERS
3—Ottumwa 20 HP box car loaders
2—Manierre 22 HP box car loaders
1—Jeffrey 20 HP box car loader
2—Red Devil portable loaders, 12" x 15"
1—Card portable loader, 11'x19"

SCRAPER CONVERTERS
1—Link Belt, 50' centers, 12" flights
1—Jeffrey, 75' centers, 9" flights
1—Jeffrey, 67' centers, 30" flights
1—Jeffrey, 72' centers, 30" flights
1—Jeffrey, 88' centers, 36" flights
1—Jeffrey drag, 28' centers, 9" drags
1—Jeffrey drag, 26' centers, 30" drags

ROTARY DUMPER
1—Card Rotary car dumper, 13'x15' platform

ELECTRIC HOISTS
1—11 HP Vulcan, single drum
1—20 HP Vulcan, single drum
1—22 HP Vulcan, double drum
1—25 HP Vulcan, single drum
1—30 HP Vulcan, single drum
1—37 HP single drum
5—30 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan, single drum
1—150 HP Vulcan, single drum
1—150-225 HP Denver double drum
1—375 HP Box single drum

RAIL
We have in stock good relaying rail 16# to 100#, also new rail and fittings, 12#, 16# and 20#.

LOADERS & CONVEYORS
2—11BU Joy loaders, 250V. D.C.
2—7BU Joy loaders, 250V. D.C.
3—5 BU Joy loaders, 250V. D.C.
1—61EW Jeffrey elevating chain conveyor
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shakers
6—G-15 Goodman shakers
8—Vulcan shakers
2—UN-17 Joy LaDel shakers
10—Goodman HA duckbills

MINING MACHINES
A.C.
1—7B Sullivan super shortwall
18—Sullivan CE7
1—CR3 Sullivan
1—28A Jeffrey
6—112A Goodman

D.C.
4—7B Sullivan super shortwall
2—T-1 Sullivan crawler type trucks
7—12AB Goodman
1—CH-11 Sullivan ironclad
1—29C Jeffrey arcwall

SCALES
3—100 ton Fairbanks railroad scales
1—125 ton Howe railroad scales

SCREENS
1—41"x68" Jeffrey-Traylor electric
1—48"x78" Jeffrey-Traylor electric
1—3'x8' Simplicity 3 deck
1—3'x12' Symons single deck
1—4'x12' Symons double deck
1—4'x12' Tyler Ty-rock 3 deck
1—2 deck shaking screen, 18'x86"
1—32'x84" 4 deck shaking screen

COAL CARS
85—60 cu. ft. Card steel, end dump, 36" ga.
88—66 cu. ft. Card steel, end dump, 36" ga.
48—150 cu. ft. Watt steel, end dump, 42" ga.
180—107 cu. ft. Watt steel, end dump, 42" ga.

SHUTTLE CARS
1—Joy model 42D5, battery operated
4—Joy model 60D3P, battery operated
7—Joy model 60D1, battery operated

CAGES AND HEAD SHEAVES
2—Card automatic self-dumping cages
2—108# Card bicycle sheave wheels
2—96" wood filled sheaves
2—84" Card bicycle sheave wheels
3—72" bicycle sheave wheels

MINE FANS AND BLOWERS
1—108" Joy La-Del axial flow fan, model L-14
1—84 Jeffrey 42" aerodyne fan
1—7" Jeffrey aerodyne 2 stage fan
6—Joy axivane series 1000 blowers, 5 HP
1—Jeffrey 261 blower, 1½ HP
7—Jeffrey aerodyne midget blowers, 1½ HP
1—2600cfm Brown-Fayro blower, 1½ HP
1—3800cfm Claridge blower, 3 HP

PICKING TABLES
1—20'x18" Link-Belt
1—41'6"x30" Card
1—73'x30"
1—51'x48" Card
1—64'x48"

LOCOMOTIVES
Battery operated
1—2 ton Whitcomb, 24" ga.
2—2½-3½ ton Mancha, 24" ga.
1—4 ton Westinghouse, 24" ga.
1—4 ton Ironton, 36" ga.
2—5 ton General Electric, 36" ga.
2—7 ton General Electric, 36" ga.
3—8 ton Ironton, 36" ga.
2—8 ton General Electric, 36" ga.
2—8 ton Goodman, 36" ga.
4—10 ton Atlas, 36" ga.

TROLLEY LOCOMOTIVES
1—2½ T. Jeffrey, 36" ga. 2—8 T. Goodman, 42" ga.
1—4½ T. Goodman, 36" ga. 3—10 T. Jeffrey, 42" ga.
1—5 T. Jeffrey, 36" ga. 1—13 T. Goodman, 42" ga.
1—6 T. Goodman, 36" ga. 1—13 T. Jeffrey, 42" ga.
1—6 T. Goodman, 42" ga. 3—15 T. Jeffrey, 42" ga.

BATTERY CHARGERS
1—8.2 KW G. E. 150/182 V., 15 HP motor, 440V. AC
1—6.5 KW Hertner, 103/120 V., 15 HP motor, 440V. AC
1—10 KW Hertner, 150/181V., 15 HP motor, 440V. AC
1—11.5 KW West., 125 V., 17.5 HP, 440 V AC motor
1—15 KW Elec. Prod. 132 V., 30 HP motor, 440 V AC
1—30 KW Hertner, 155 V., 75 HP motor, 440 V. AC
4—250V D.C. battery charging switchboards
1—Joy battery charger, model U-248-20GE 128.5 volts 25 HP motor, 440 volts AC
1—Joy battery charger, model U-248-20GE 128.5 volts 30 HP motor, 250 volts DC
2—Joy battery chargers, model U-248-BE3 123.5 volts, 15 HP motors, 250 volts DC
3—Wooton type P-48, 132 V., 30 HP motors, 250 V. DC

MOTOR-GENERATOR SETS
1—7 KW G. E., 125 V., 15 HP motor, 440 V. AC
1—7½ KW Century, 125 V., 15 HP motor, 440 V. AC
1—22 KW West. 125 V., 34 HP motor, 440 V. AC
1—40 KW Milwaukee 240 V., 50 HP motor, 440 V. AC
1—40 KW Imperial 250 V., 60 HP motor, 440 V. AC
1—75 KW Ft. Wayne 250 V., 100 HP motor, 440 V. AC
1—75 KW Ridgway 125 V., 115 HP motor, 2200 V. AC
1—165 KW G. E. 600 V., 300 HP syn. motor, 440 V. AC

ROCK DUSTERS
1—M.S.A. type A, 2 HP 250V. DC motor
1—M.S.A. type A, 440 V. AC motor
1—M.S.A. #S-1163, 20 HP 230 V. DC motor

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CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

MAINTENANCE SUPERVISOR for conventional mechanical mining machinery of 2500 t.p.d. mine located in eastern Kentucky. Must have proven record of effective preventive maintenance and repair and ability to train repairmen. Formal mining engineering training preferred. Salary in keeping with strict requirements of position. Address replies to Black Star Coal Corporation, P. O. Box 359, Louisville 1, Kentucky.

POSITION WANTED

MAN WITH 22 years experience in coal industry including 9 years supervisory, 2 years U.S.B.M., 3 years manufacturers representative (2 years loaders—1 year Carbide tipped tools). Now employed as assistant M.F. desires job as manufacturers representative or safety supervisor. PW-6010, Coal Age.

COAL MINING PLANT FOR LEASE

Coal acreage located in celebrated Connellsville region of Western Pennsylvania, a superior quality metallurgical fuel. Minimum investment required to place mine in condition for immediate operation. Mine equipped with coal washery, coke ovens, etc. Approximate capacity 600 tons daily.

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OUR EQUIPMENT LOOKS EXPENSIVE BUT OUR PRICES ARE REAL LOW

2—Jeffrey 29-UC Universal Cutting Machines. In 20,000 series, 250 V, permissible type, practically new cats, cutter bars and chains.
8—5-SC Joy Shuttle Cars, 4-wheel drive, 4-wheel steer, elevated discharge, airplane brakes.
10—14BU-3PE Joy Loading Machines, Magnetax controls, 7½ and 10 HP motors.
150—Practically new 6-ton all steel Sanford-Day Drop Bottom Mine Cars, 14" wheels, 48" gauge.
300—5-ton all steel Sanford-Day Rotary Dump Mine Cars, 42" gauge.

CONVERSION EQUIPMENT:

2—500 KW Westinghouse Synchronous Rotary Converters, 250/275 V, 6 phase, 60 cycle, 1200 RPM, 2000 amp., in the 4,000,000 series, complete with switchboards and all necessary switchgear including 2300/4000 V transformers.
3—300 KW G.E. Synchroneous Rotary Converters, Type HCC-6, Form P, 1200 RPM, 250/275 V, 2300/4000 V transformers, switchboards and all necessary switchgear including automatic reclosing circuit breakers.
1—200 KW G.E. Synchronous Rotary Converter, Type HCC-6, Form P, 1200 RPM, 250/275 V, 2300/4000 V transformers, switchboards and all necessary switchgear including automatic reclosing circuit breakers.
2—300 KW late type Westinghouse Motor Generator Sets, 4,900,000 series, 250/275 V, 1200 RPM, 3 phase, 60 cycle, 2300 V, with switchboards and full automatic AC and DC switchgear.
2—200 KW G.E. Motor Generator Sets, 250/275 V, 1200 RPM, switchboards and full automatic switchgear. Like new.
2—150 KW G.E. Portable Motor Generator Sets, 1200 RPM, 250/275 V, 3 phase, 60 cycle, 2300 V, switchboards and all necessary switchgear with automatic breakers.

BARGAINS IN LATE TYPE REBUILT LOCOMOTIVES:

5—15-ton Jeffrey MH-110 Locomotives Ser. Nos. 6819-7153-7257-7305-7306.
2—15-ton Jeffrey MH-77 Locomotives, Ser. Nos. 7304-7790.
1—20-ton Jeffrey MH-77 Locomotive, Ser. No. 7615. Now 42" gauge; will change to meet your requirements.

Bargain in 30" Inside Belt Conveyor, 3-ply, 28 oz., duck, Hewitt-Robbins, complete with 2000' of Robbins Conveyors and 4000' of Belt, single strand. Complete unit. Practically new condition. Bargain for quick sale.

1—Double Clutched Drum 480 HP Vulcan Hoist complete with air brakes, Lilly control, and all necessary late type equipment.
1—Double Drum 600 HP Vulcn Hoist, one drum clutched, will spool 1100' of 1¼" rope. Post brakes, Lilly control, and all safety devices.

Several other Single and Double Drum Hoists, all offered at very low prices.

All types of late type Cutting Machines—track, rubber tired, and cat mounted.

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Coal Preparation Equipment
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All types of Joy Cutters, Loaders, Shuttle Cars, Cat Trucks, Belt Conveyors, Chain Conveyors, etc. Includes

JOY EQUIPMENT—rebuilt

1—Joy 11 BU rubber tired Cutter.
1—Joy 3 JCM Continuous Miner, 34" ht.
1—Joy 14 BU, 7 RAE Loader, 10 H.P. head motors.
2—Joy 14 BU, 7 BE Loaders, 10 H. P. head motors.
6—Joy 14 BU, mod. pedestal Loaders.
1—Joy 12 BU, 9E Loaders, 26" ht.
2—Joy 8 BU type 11E Loaders.
3—Joy 11 BU high capacity Loaders.
3—Joy 6 SC Shuttle Cars, four wheel drive. Elevating Discharge.
4—Joy 32E9 Shuttle Cars.
6—Joy 32E15 Shuttle Cars.
8—Joy 32D Battery Cars.
6—Joy 42E13 Shuttle Cars.
4—Joy 42D Shuttle Cars.
3—Joy T1 Standard Cat Trucks.
2—Joy Ladel MTB 30" Belt Conveyors. 1000 Ft.
6—Joy Ladel 12" Chain Conveyors, 300 Ft.
2—Joy PL-11-14 Elevators on rubber.
2—Joy PL11-5E Elevators.
4—Joy 11B Cutting Machines, like new.
4—Joy 7B Cutting Machines, rebuilt.

LOCOMOTIVES

1—Jeffrey 15 ton type 2154, 250 volt, 44" Ga.
3—Jeffrey 15 ton, type MH-110, 250 volt, 42", 44" and 48" Ga.
3—Jeffrey 10 ton, type MH-78, 42" and 44" Ga.
3—Jeffrey 8 ton, type MH-100, 42" and 44" Ga.
12—Jeffrey 6 ton, type MH-88, 42", 44" and 48" Ga.
2—Jeffrey 4 ton, type MH-96, 42" and 48" Ga.
3—G. E. 4 ton, type 825 Locomotives.
10—G. E. 6 ton, type 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G. E. 8 ton, type 822 Locomotive, 44" Ga.
3—G. E. 10 ton, type 800 Locomotives, 42", 44" and 48" Ga.
8—Goodman type 33, 6 ton, 44" and 48" Ga.
2—Goodman 8 ton, type 32A, 44" and 48" Ga.
1—Goodman 10 ton, type 34B, 48" Ga.
2—Goodman 13 ton, type 29A, 44" and 48" Ga.
1—Westinghouse, type 902, 4 ton.
2—Westinghouse, type 904, 4 ton.
2—Westinghouse, type 904, 6 ton.
1—Westinghouse, type 907, 10 ton.
6—Gasoline and Diesel Locomotives, 4 to 20 tons.

TIPPLE EQUIPMENT

2—Cedar Rapids portable Screening Plants.
1—Allis Chalmers 5' x 14' Rippiflo Vibrator.
1—4' x 10' Robbins Gyrex Vibrator.
2—Double Roll Crushers.
Feeders, Drag Conveyors and Loading Booms.

CUTTING MACHINES

1—Jeffrey 29U on rubber.
1—Jeffrey 29C on cats.
6—Jeffrey 35L's, like new.
12—Jeffrey 35B and 35BB.
2—Jeffrey 29B's on trank.
3—Jeffrey 29L, track mounted.
4—Jeffrey 29C, track mounted.
4—Baby Goodman, 212's, rebuilt.
3—Goodman 312 Cutters, 18" ht.
3—Goodman 512 EJ Cutters.
15—Goodman 12AA and 112AA.
2—Goodman 224 Slabbers.
2—Goodman 724 Slabbers.

LOADING MACHINES

16—Joy Loaders, all types.
1—Jeffrey 61 CLR on rubber, 26".
2—Jeffrey 43L Shortwall Loaders.
3—Jeffrey L-500 Loaders.
2—Goodman 380 Loaders.
4—Myers Whaley No. 3 Automat Loaders.

CONVEYORS

10—Jeffrey 61 HG Face Conveyors.
12—Jeffrey 61 AM Room Conveyors, 300'.
4—61 EW Elevating Conveyors.
2—Joy 30" Belt Conveyors.
4—Joy Ladel UN-17 Shakers.
16—Goodman G-12½ and G15 Shakers.

DIESEL PLANTS AND CONVERTERS

1—International 50 KW, DC.
1—75 KW, G. M. C. 6-71, DC.
2—Superior, 100 KW, DC.
1—Cummins, 125 KW, DC.
1—G.M.C. 6-71, AC, 75 KVA.
1—Allis Chalmers 200 KVA, AC (Natural Gas).
2—150 KW G. E. HCC-6 Rotaries.
3—200 KW, G. E. HCC-6 Rotaries.
1—200 KW Allis Chalmers Rotary.
1—300 KW Westinghouse.
(All the above with 2300/4000-6900/13000 Volt Transformers)
2—150 KW MG Sets, G. E. and Westinghouse.
1—200 KW, MG Set, Westinghouse.
1—300 KW MG Set, Westinghouse.

ROCK DUSTERS

1—MSA hi pressure on rubber.
1—MSA hi pressure on skids.
1—MSA low pressure Room Duster.
1—MSA hi pressure Track mounted.
2—Canton Dustributors, lo-pressure.
1—Canton hi pressure, track mounted.

MISCELLANEOUS

480 Mine Cars, Drop Bottom and End Dump. All Gauges.
4—Brown Fayro HKL and HGD Car Spotters.
1—12 ton Differential Slate Larry.
1—Hardscog Horizontal Drill.
1—16 Yd. Dragline Bucket.
5—Low Vein Water Cars.
Incline Hoists, 25 to 50 H. P.
Machine Tools for Mine Shops.
200 tons Rails, all sizes.
30 tons Copper Trolley and Feeder.
300 Transformers from 1 to 2000 KVA, 110 to 13000 Primary Volts.
300 Electric Motors, 3 to 200 H. P.
Thousands of other items.

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We carry a large stock of rebuilt and guaranteed transformers, and invite your inquiries.

Custom-built transformers and coils manufactured to your specifications.

***Expert Repair Service*—all makes and sizes of transformers rewound, repaired and redesigned. Ask for our price schedule.**

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40 Years' Dependable Service

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40-60#

RELAY RAIL

28 to 30 ft. lengths

W 5803 COAL AGE
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Rebuilt Mine Equipment

1—18 x 18 Jeffrey Single Roll Crusher
1—36 x 36 Jeffrey Single Roll Crusher
1—20 x 24 Pitts-McNally Double Roll Crusher
1—American Ring Pulverizer—200 tons per hr.
1—Jeffrey Apron-Type Feeder 24" x 5'
1—Jeffrey Apron-Type Conveyor—60' centers, 36" wide
1—Thomas Elevator Hoist, 4' drum, 75 HP slip ring Motor, 3 ph, 220-440 V., complete with controls excellent condition
2—100 HP Heggie Simplex Fire Box Low Pressure Heating Boilers, complete with accessories

DUGGER ELECTRIC EQUIPMENT CO.

Dugger, Indiana

Phones 121 or 42 **W. M. Hunley**

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Complete Electrical Substation
For sale at a sacrifice.

3 G. E. Motor Generator Units with synchronous motors new in 1948
GENERATORS—200 KW—125/250 volt 900 R.P.M.
MOTORS—280 H. P.—2300 volt 3 phase 900 R.P.M.

Together with all AC and DC switch gear, cut outs, fuses, current transformers, etc.

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600

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with 12 ft. diameter drums.

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Cables: Omniplant, Telex, London.

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Lima Model 2400, 6 cu. yd. Bucket, 110 ft. Boom, Priced Right.

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K. O. Shaner
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TRANSFORMERS
NEW · REBUILT
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT CO.
PHONE STATION COLLECT GL 6783
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WANTED TO BUY

50 ton Motor Truck Scale with 45' x 10' platform equipped with weightograph and four section pipe lever. Also 34' x 10' platform truck scale with weightograph.

BRADFORD COAL COMPANY
BIGLER, PA.

FOR SALE

We offer the following equipment for sale, subject to inspection and to prior sale, F.O.B. our mine, terms net cash.

2—General Electric 200 K.W. rotary synchronous converters, serial #2238746 and #1423805, type #TC-6, form "P", 1,200 R.P.M., 250-300 volts D.C., 667 amps., 60-cycle, 50° rise, complete with hand circuit breakers, all necessary switch gear and panel boards and, including a total of six transformers, General Electric type #HR, form "K", 75 K.V.A., capacity 2,300/4,000 volts, 185—92.5, reactance of 5%, 60-cycle.

1—#3JCM-2BE Joy continuous miner, 250 volts D.C., U.S. Bureau of Mines permissible plate, approval #2-773, serial #JM-247.

1—#4-WS-2 Joy skid mounted high pressure water spray unit, 250 volts D.C., permissible plate, serial #WS-157.

Approximately $14,000 worth new spare parts for above continuous miner.

1—#12BU-9E Joy loading machine, serial #3696, approval #595 with permissible plate, 250 volts D.C., with rear conveyor to load into mine cars or shuttle cars.

Approximately $1,600 worth of new spare parts for above loading machine.

Also approximately $2,400 worth new spare parts for model #6SC5E-2 Joy cable reel shuttle car.

All of the equipment listed above is in excellent condition and some of it may be inspected in operation. We will sell at very attractive prices or will trade for #11BU Joy loaders, #512 Goodman shortwall mining machines, Universal cutting machines of any standard make, or possibly other equipment which you may have available for trading.

If you wish to make inspection of any of the above equipment or to make us an offer for purchase or for any trades, as indicated, please communicate with

THE LORAIN COAL & DOCK COMPANY
33 North High Street, Columbus 15, Ohio

SAVE ON RAILS

BUY "GUARANTEED RELAYERS"

Handle more cars better — spend less to install & maintain with Foster Relayers. "Open-stock" shipments, all sections 12# thru 175#. Switch Materials, Track items.

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BONDED COAL EQUIPMENT BARGAINS

WRITE, WIRE OR PHONE — IMMEDIATE SHIPMENT FROM STOCK
SAVE UP TO 50%. BUY NOW BEFORE ADVANCING LABOR & MATERIAL COSTS FORCE US TO INCREASE OUR PRICES.

NEW TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
16"	20'	$ 991	$ 548
16"	45'	1785	937
18"	25'	1229	684
18"	45'	1839	1005
18"	85'	3209	1665
18"	100'	3704	1912
24"	25'	1322	773
24"	45'	2062	1145
24"	100'	4097	2166
24"	130'	5207	2773
30"	25'	1421	847
30"	65'	3101	1718

LONGER LENGTHS WITH EXTRA FEATURES

In addition to features described above, these conveyors include Gravity Takeup, Lagged Head Pulley, Self Cleaning Wing Tail Pulley. Head Shaft and Bearings 2-15/16". Tail Shaft and Bearings 2-7/16". Side Guide Idlers—1 pr. each for Head and Tail.) Snub Roll at Head end 12¾" diam. using 1-15/16" shaft and bearings. Ratchet and Pawl Holdback. Return belt cover at slight extra cost.

Belt Width	Length of Conveyor	List Price	Sale Price
18"	150'	$ 6209	$3507
18"	200'	7859	4336
18"	250'	9509	5164
18"	300'	11159	5993
24"	150'	6820	3949
24"	225'	9595	5356
24"	300'	12370	6763
30"	150'	7664	4479
30"	220'	10604	5971

Other lengths & belt widths at bargain prices.

NEW CRUSHERS

Double and single roll models. Types to produce ¾" stoker and others to crush up to 8" resultant. Capacities from 15 to 500 tons per hour. Steel hoppers included.
Priced from $479.00

NEW MOTOR TRUCK SCALES

For stationary and portable applications. Scales have steel lever system complete with structural steel weighbridge. Capacities to 50 tons. Recording beams available.
20 Ton Truck Scales $525.00
26 Ton Truck Scales 782.00

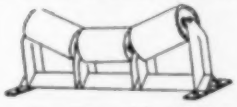
NEW CONVEYOR BELTING SAVE 28%

Heavy duty 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.

Width	List Price	Sale Price
16"	$3.64 foot	$2.62 foot
18"	4.03 foot	2.90 foot
24"	5.23 foot	3.76 foot
30"	6.39 foot	4.60 foot

Additional widths and plies available at low prices. Write for free sample.

NEW IDLERS & RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5" dia. Troughing Idlers for

16" belt..	$17.25	30" belt..	$19.50
18" belt..	18.00	36" belt..	20.25
24" belt..	18.75	48" belt..	21.75

1-roll, 5" dia. Return Idlers for

16" belt..	$ 6.75	30" belt..	$ 8.25
18" belt..	7.13	36" belt..	8.75
24" belt..	7.50	48" belt..	10.25

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Either sealed type (pre-lubricated) or with alemite fittings. Rust proof ball races. Maintenance is negligible.

NEW PREPARATION PLANTS

For cleaning coal with or without crushing. Easily moved. Ideal for strip coal operators. Improved design can include vibrating shaker screen, refuse pans, all conveyors, storage hopper, feeder, single or double roll crusher, picking table, frames, walkways and floor plates, complete with motors and drives. Prices vary depending on capacity and results wanted and are priced from $5700.00. One $7500 model in stock to close out at $3950.00. Full information in Bulletins 951 and 1023. Write for them.

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1½ to 10 Tons 18" to 56½" Track Gauge.
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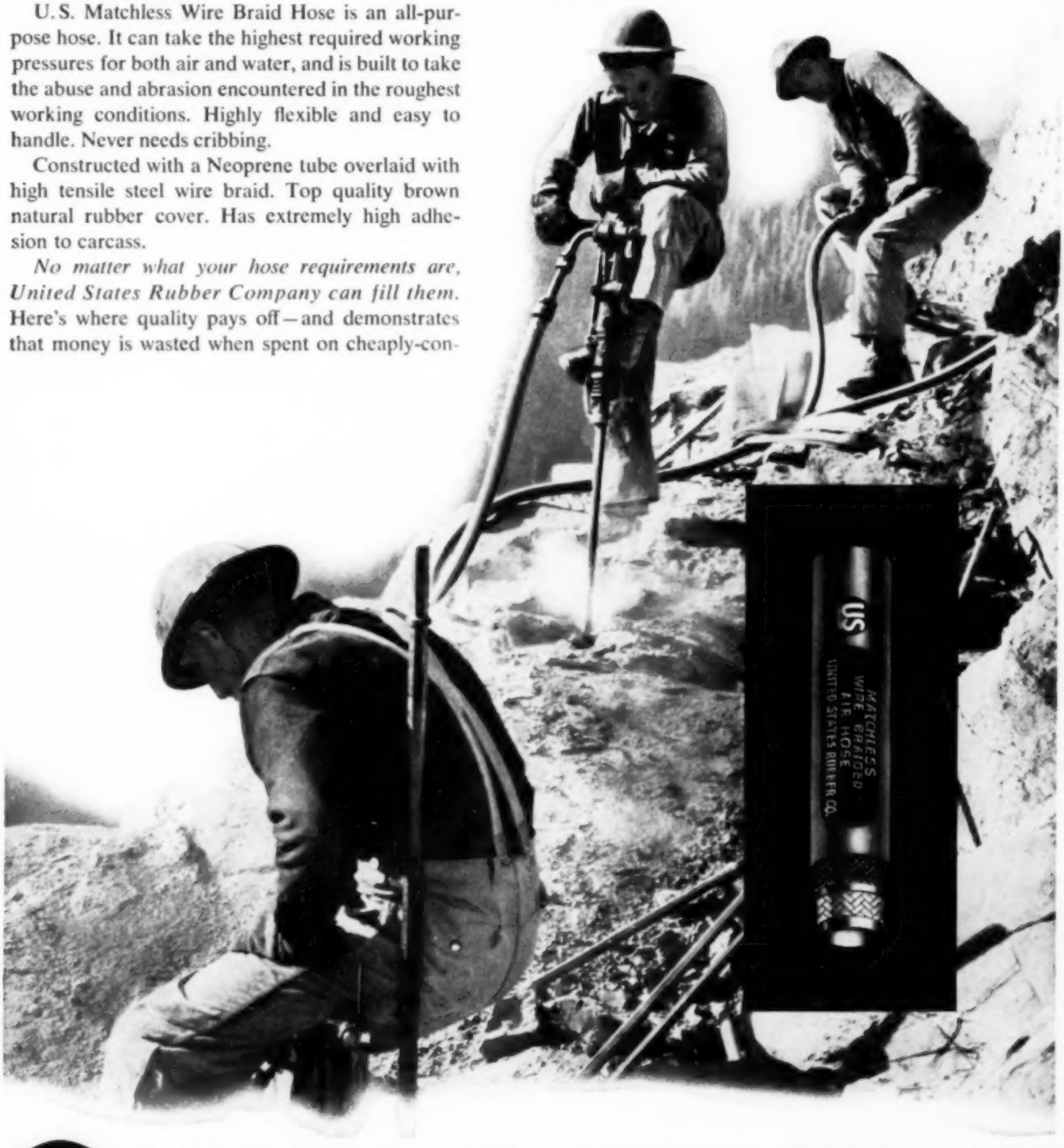
This is the hose engineered specifically for hard rock mining, quarrying and tough construction work anywhere in the world—designed by men who *know* what a hose must do.

U.S. Matchless Wire Braid Hose is an all-purpose hose. It can take the highest required working pressures for both air and water, and is built to take the abuse and abrasion encountered in the roughest working conditions. Highly flexible and easy to handle. Never needs cribbing.

Constructed with a Neoprene tube overlaid with high tensile steel wire braid. Top quality brown natural rubber cover. Has extremely high adhesion to carcass.

No matter what your hose requirements are, United States Rubber Company can fill them. Here's where quality pays off—and demonstrates that money is wasted when spent on cheaply-constructed, short-lived hose. Expert "U.S." engineers will aid you in your hose selection and engineering problems. Call any of the 27 "U.S." District Sales Offices.



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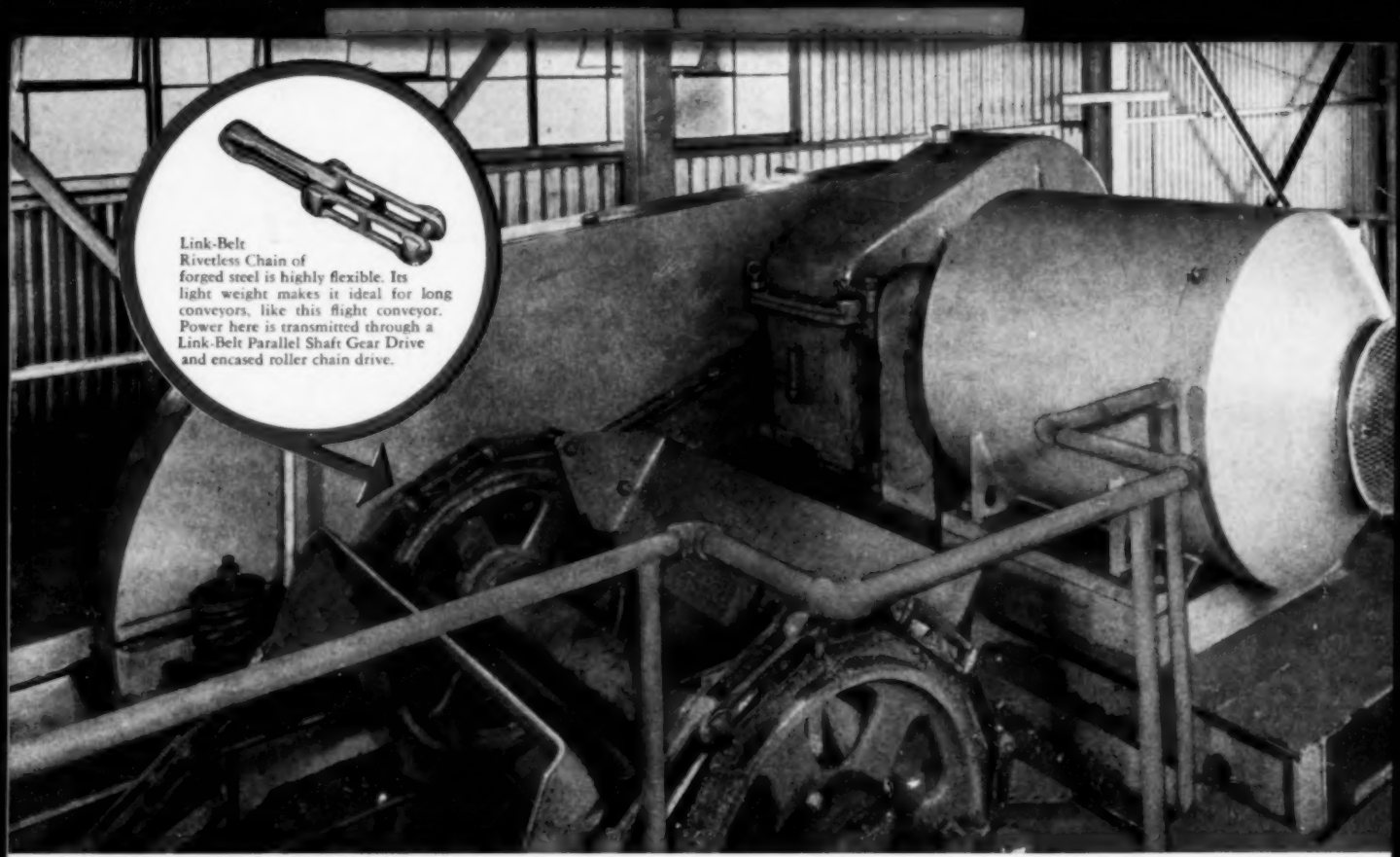


SIMPLICITY *plus* HIGH STRENGTH

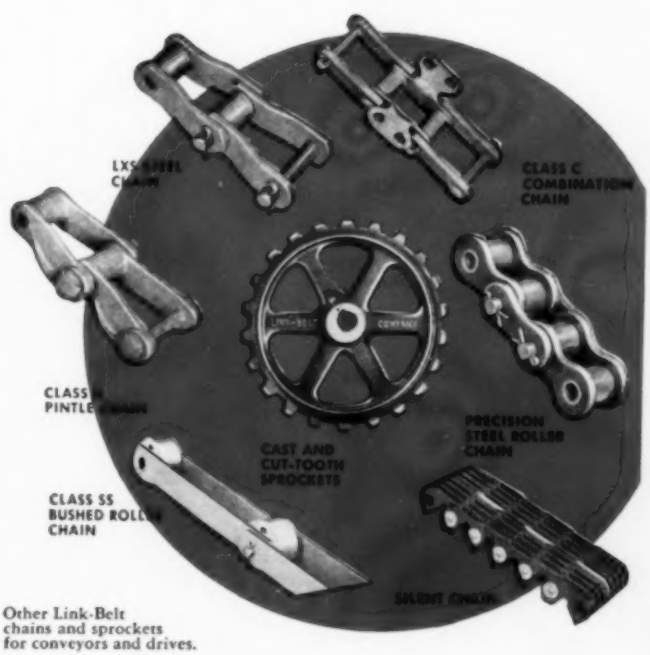
makes Link-Belt Rivetless Chain RIGHT for coal handling

Here's proof that it pays to choose from the complete Link-Belt Line

This is a typical example of chain design that cuts conveying costs. The simplicity of Link-Belt Rivetless Chain permits dismantling by hand, *without tools*, to alter chain lengths or make replacements. And although it has the light weight desired for normal service, it also offers the high strength needed to meet sudden impacts and heavy overloads. It can be furnished heat-treated if desired.

Engineering refinements are the rule in every Link-Belt drive and conveying chain. And breadth of selection further assures the *best* answer for every requirement. In fact, no other single source can match the broad range of Link-Belt roller and silent chain . . . of cast, combination, forged and fabricated steel chains.

You can get all the facts on Link-Belt chain from your nearby Link-Belt office or authorized stock-carrying distributor. Put in a call today.



Other Link-Belt chains and sprockets for conveyors and drives.

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